

# MOTOR AGE

MARCH 4, 1915

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March-April 1915

Mar

**DANN Insert SPRINGS** — supplied with DANN Insert ready installed — are a new addition to our line. Write for details.

Inter-leaf shock absorption, endorsed so strongly by leading automobile authorities, is obtained only by use of

## **DANN INSERT** "The Inter-leaf Shock Absorber"

DANN Insert is a perfect shock absorber built into the spring. It is not an attachment.

DANN Insert is entirely unlike other shock absorbers. It permits the car to remain locked together as substantially as ever. No rocking—no side-sway—no loosening of connections between body and driving mechanism.

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The shock-absorbing Insert extends from tip to tip between every spring leaf. It places a shock and vibration dampener in direct contact with every square inch of bearing surface between these spring leaves.

For these reasons DANN Insert is effective not at one point only, as with ordinary shock absorbers, but effective throughout the entire length and breadth of the spring.

The thousands of perforations in the strips of DANN Insert are packed with a graphite compound. These little graphite pads cushion the series of jolts and shocks to which springs are continually subjected.

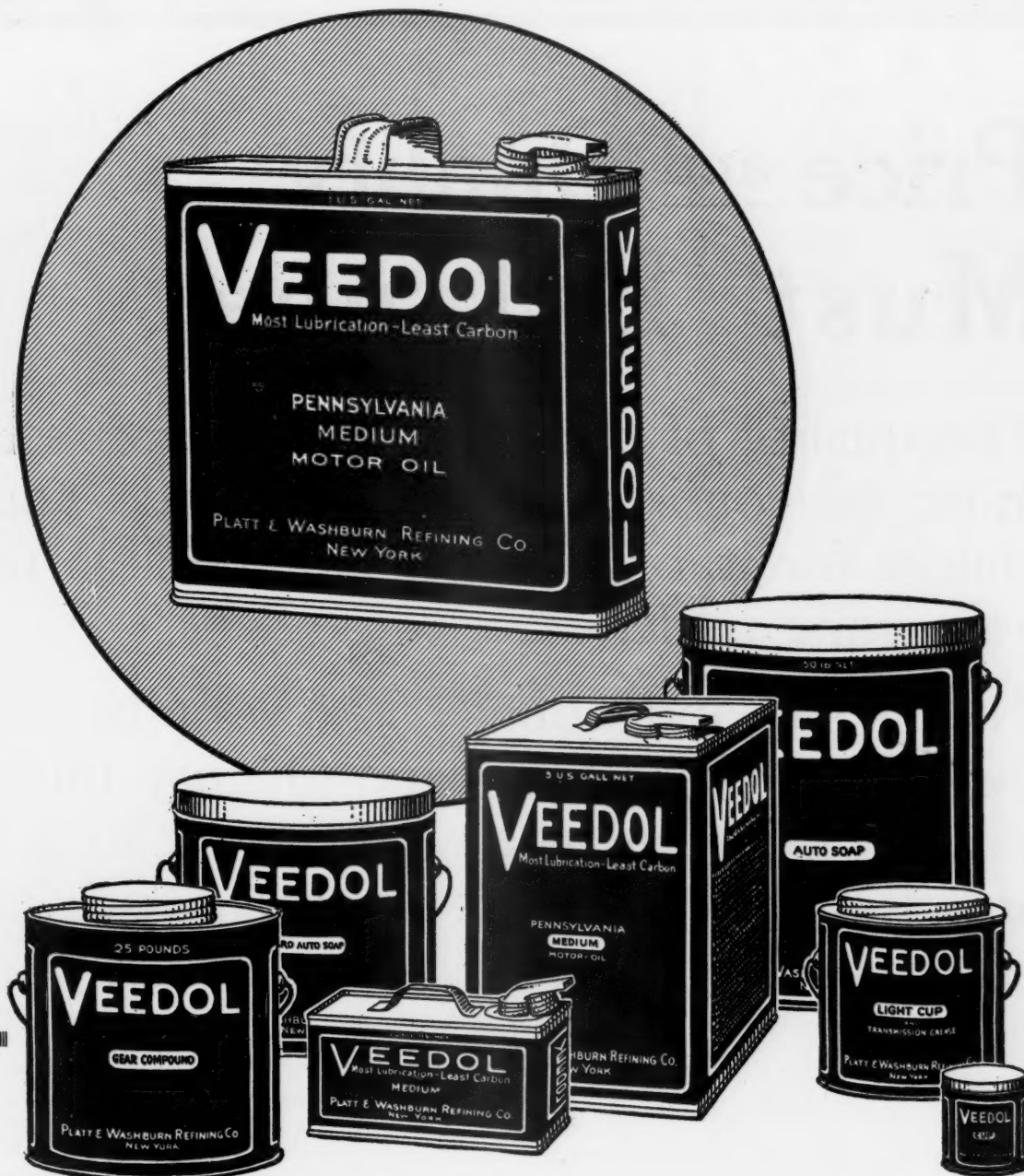
These perforations in the Insert have a further effect in breaking up vibration. A shock cannot be transmitted in a direct line along the Insert strip—it must go around the innumerable perforations.

Strips of DANN Insert are of soft, non-shock-conducting metal. Now the highly tempered metal of which springs are made is an ideal shock and vibration conductor. But the soft metal strips of DANN Insert placed between these highly-tempered leaves act upon shocks much as strips of soft lead would.

They smother the shock—cut it up—render it harmless.

DANN Insert in no way retards natural spring action. By furnishing a glassy-smooth bearing surface between the leaves—by filling in the more or less uneven surface of these leaves with graphite compound—the flexibility and sensitiveness of the spring is increased.





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"THE ORIGINAL AND BEST ASBESTOS BRAKE LINING"

## The Royal Equipment Company

1354 Bostwick Avenue

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Volume XXVII

March 4, 1915

No. 9

## Contents

DARIUS RESTA WINS AMERICAN GRAND PRIX IN PEUGEOT.....	5
Wet weather mars classic, only five of thirty cars finishing— Second and fourth for Stutz	
UNCLE SAM FINDS NEW WAY OF MAKING GASOLINE.....	10
Government reports discovery of way to triple product of fuel— Will patent and give to American people	
EDITORIAL—DEVELOPING A MOTOR SENSE—GOVERNMENT IN FUEL FIELD .....	12
TEXAS COURT CALLS CAR STEALING ONLY A MISDEMEANOR...	13
Decision holds such a theft is not a felony	
HOLDS CHALMERS NO INFRINGER OF BAKER PATENTS.....	14
Decision in American Ball Bearing Co. suit	
REPORTS DATA ON GASOLINE-ELECTRIC CAR.....	15
S. A. E. metropolitan section traces its progress	
SYRACUSE SECTION TO ABSORB MANY CARS THIS YEAR.....	16
Anticipated volume of prospective business estimated at \$5,000,000 —Outlook in and around New Haven, Conn.—Boston ready for show opening	
SOUTHWEST'S BIG CROPS SPELL MOTORING PROSPERITY.....	18
Conditions among farmers analyzed by an expert	
CHICAGO INSTITUTES A SHORT-HAUL JITNEY SERVICE.....	20
News of the busmen in other large cities—John N. Willys tells of jitney progress in England and figures street railway interests may block American movement temporarily	
POINTS OUT POSSIBLE DANGERS OF JITNEY BUS COMPETITION..	22
Views of president of Fifth Avenue Coach Co. of New York	
GUAYULE A FACTOR IN THE RUBBER WORLD.....	24
How Mexicans are developing the shrub	
MOTOR CAR DEVELOPMENT.....	32
Knox tractor and White's new power hoisting body	
THE SINGLE VS. TWO-WIRE METHOD OF WIRING CARS.....	34
Arguments set forth by the adherents of each system	
INDEX TO ADVERTISEMENTS.....	94

#### DEPARTMENTS

See America First.....	13	Among Makers and Dealers....	39
Routes and Touring Information	26	Coming Motor Events.....	39
Readers' Clearing House.....	28	Brief Business Announcements..	40
The Accessory Corner.....	36	Recent Incorporations.....	41
From the Four Winds.....	38	Motor Car Repair Shop.....	42

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having over-  
looked forward-  
ing my *dues* to  
MOTOR AGE"

—Subscriber's letter.

This extract from a sub-  
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keynote of MOTOR AGE'S  
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enthusiastic and influen-  
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is a deep and lasting inter-  
est in motoring—the king  
sport of the American gen-  
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and *run* them.

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struction. They pay  
"dues"—\$3.00 a year—  
which are returned to them  
many times over in the in-  
formation which they *look*  
for and *find* in the edit-  
orial and advertising col-  
umns.

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**The Product of Specialists:** A system built by specialists in electric starting-lighting will naturally give you better service than the ordinary system.

**Efficiency:** Electric equipment which is used on 175,000 cars has necessarily **PROVED** its efficiency.

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**GRAY & DAVIS Inc.,**

**Boston, Mass.**

# MOTOR AGE

## Darius Resta Wins American Grand Prix in a Peugeot



HOWARD WILCOX  
STUTZ—SECOND



HUGHIE HUGHES  
ONO—THIRD



DARIUS RESTA  
PEUGEOT—WINNER

### HEAVE HO, ME HEARTIES!

Had Thomas Lipton had the hunch  
That it was due to rain,  
He would have brought his Sham-  
rock

Across the raging main;  
And breaking out a spinnaker  
To meet the water's rise,  
He'd have drifted home a winner  
Of America's grand prize.

### AND ANOTHER HEARTY HEAVE

Strike up the band!  
Here comes a sailor;  
What chance had Bragg,  
Cooper or Taylor?  
When raindrops fall,  
Wind blows a squall,  
Resta takes the kale  
For he's a sailor.



GIL ANDERSON  
STUTZ—FOURTH



LOUIS DISBROW  
SIMPLEX—FIFTH

By Al. G. Waddell

SAN FRANCISCO, Cal., Feb. 27—  
Special telegram—England not  
only rules the waves but now holds  
the grand prize as well and the al-  
lies have scored their first victory  
on American soil.

Darius Resta, who springs from a  
stock of water-loving men, today  
slipped and skidded to the front in  
the sixth race for the gold cup of  
the Automobile Club of America and  
\$3,000 in prize money. It was a  
hyphenated triumph, an English-  
French victory. Resta is a daring  
Briton who recently crossed the At-



AS THE PITS LOOKED WHILE THE DRIVERS WERE WAITING FOR THE VANDERBILT ON FEBRUARY 22. THIS RACE WAS POSTPONED TO MARCH 6. THIS SCENE, HOWEVER, SHOWS HOW IT MUST HAVE LOOKED AT THE GRAND PRIX LAST SATURDAY

lantic to pursue fortune and fame in a neutral nation. The car in which he achieved his hazardous feat is a Gallic speed creation and bears the trademark of Peugeot on its hood.

Resta's racing debut in America was a veritable baptism. The speed carnival of the Panama-Pacific exposition was suddenly changed into a water fete 1 hour after the grand prize contenders were sent away. Rain fell during 5 of the 7 hours that the cars were careening around the course and the race was run under the most gruelling conditions imaginable. The 3.84-mile track, part of which was covered with heavy planks, was so dangerous that ten of the thirty drivers who started withdrew, refusing to take further chances in the driving downpour. Resta, however, was made of sterner stuff. His ancestors have sailed the sea in heavy storms and faced unflinchingly the deadly fire of the enemy's ships. With such tradition behind him, he could not well abandon the contest because of leaking clouds.

#### Slowest Time in Race's History

Driving a masterful and daring race, Resta covered the 400.28 miles, or 104 laps, of the 3.84-mile course, in 7 hours, 7 minutes and 57 seconds, an average speed of 57.5 miles per hour and the slowest time ever made in the history of competition for the grand prize. Although the time is slow in comparison with former grand prize records, Resta's drive establishes a new record for a greasy, slippery course that has no less than two right-angle turns,

and which near the end of the contest became a miniature swamp. The Briton's willingness to take chances in a test of endurance and dare-deviltry accounts for

his victory as much as does his wonderful skill at the wheel.

Although forced to acknowledge the supremacy of a foreign combination, American cars and drivers made a most creditable showing and gave Resta and his victorious Peugeot a battle all the way. Howdy Wilcox, driving a Stutz, was second to drift across the finishing line. He was 7 minutes abaft the Peugeot and its intrepid skipper. Hughie Hughes, a naturalized Englishman, put the prow of his craft over for third place. Hughes was at the helm of the Ono, a Pacific coast creation and a hybrid, consisting of a Fiat chassis and a Pope-Hartford motor. Gil Anderson, the dean of the Stutz racing team, took fourth money, and Louis Disbrow, with a Simplex of his own design, was fifth to complete the arduous voyage and the last man to get the checkered flag.

#### Rain Forces Many to Quit

When the Simplex was buffeted between the buoys by a tidal wave of mud and water and Starter Wagner hung up his flags to dry, eight other cars were sliding around the course—Louis Nikrent's Mercer, Harry Grant's Case, Tommy McKelvy's Overland, Kennedy's Edward Special, Jack Gable's Tahis, Newhouse's Delage, Durant's Chevrolet and Taylor's Alco.

Ten other cars had been withdrawn, not because of mechanical trouble but because their drivers were less amphibious than were Resta, Wilcox, Hughes and the others who took chances on the slippery course in order to finish. These included the fol-

#### GRAND PRIZE RESULTS

Running				
Car	Driver	Time	M.P.H.	Prize
Peugeot	Resta	7:07:57	57.5	\$3,000
Stutz	Wilcox	7:14:36	55.25	2,000
Ono	Hughes	7:21:46	54.25	1,500
Stutz	Anderson	7:31:38	53.2	1,000
Simplex	Disbrow	7:34:51	52.8	500

#### STILL RUNNING

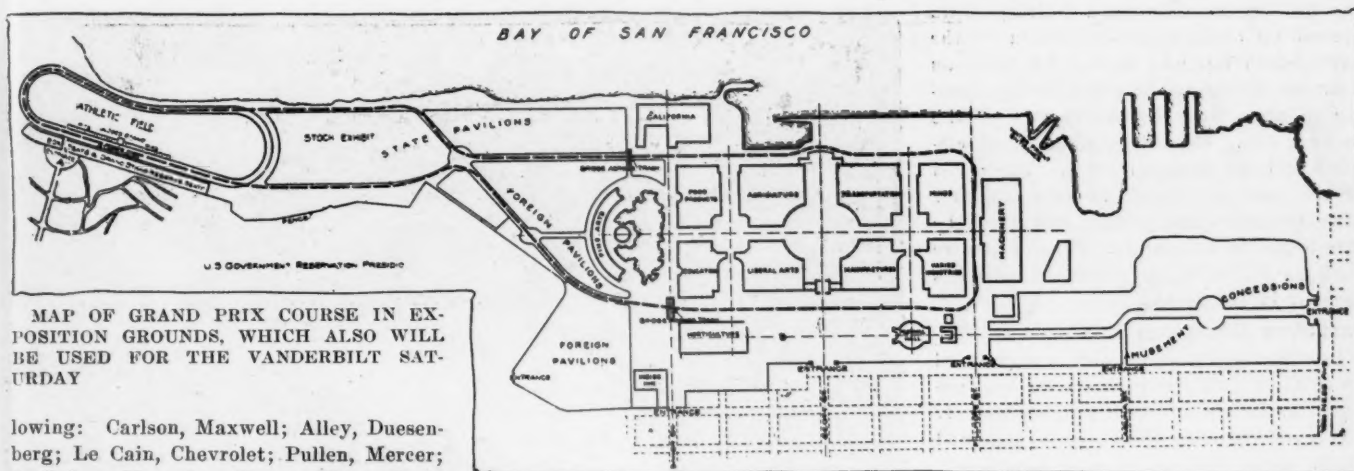
Car	Driver	Lap
Mercer	Nikrent	99
Case	Grant	98
Overland	McKelvy	94
Edwards Special	Kennedy	90
Tahis	Gable	89
Delage	Newhouse	89
Chevrolet	Durant	87
Alco	Taylor	82

No time taken on these cars. Lap indicates approximate position only.

#### ALSO RAN

Car	Driver	Lap	Reason
Maxwell	Carlson	94	Withdrawn
Duesenberg	Alley	88	Withdrawn
Chevrolet	LeCain	80	Withdrawn
Mercer	Pullen	72	Withdrawn
Mercedes	De Palma	67	Withdrawn
Case	Hearne	65	Withdrawn
Mercer	Ruckstall	64	Withdrawn
Parsons Special	Parsons	59	Withdrawn
Duesenberg	O'Donnell	58	Withdrawn
Gordon Special	Gordon	52	Withdrawn
King	Klein	48	Broken piston
Maxwell	Rickenbacher	44	Fouled sp'k plugs
Californian	Bragg	33	Withdrawn
Maxwell	Oldfield	29	Broken piston
Edwards Special	Gandy	23	Wrecked
Bugatti	Marquis	10	Ignition trouble
Stutz	Cooper	4	Broken crankcase





MAP OF GRAND PRIX COURSE IN EXPOSITION GROUNDS, WHICH ALSO WILL BE USED FOR THE VANDERBILT SATURDAY

lowing: Carlson, Maxwell; Alley, Duesenberg; Le Cain, Chevrolet; Pullen, Mercer; de Palma, Mercedes; Hearne, Case; Ruckstall, Mercer; Parsons, Parsons Special; O'Donnell, Duesenberg; Gordon, Gordon Special, and Bragg, Californian.

#### Cooper First to Go Out

Six cars were docked with irreparable injuries by their pilots. Earl Cooper, one of the heavily-backed favorites, was the first to abandon the contest, his Stutz sustaining a broken crankcase after completing four laps. The German Bugatti, tooled by Marquis, went out on the tenth lap with ignition trouble. Lou Gandy wrecked the Edwards Special on the twenty-third circuit of the track, skidding into a straw bank on the northwest corner of the course and breaking his steering gear. A broken piston on the Maxwell forced Barney Oldfield's retirement on the twenty-ninth lap. Caleb Bragg, winner of the grand prize in 1912, abandoned the Californian after driving 126 miles, as he had no non-skid tires in his pit. Fouled spark plugs are given as the reason for the withdrawal of Rickenbacher's Maxwell on the forty-fourth lap and a broken piston put Klein's King in the discard on the forty-eighth circuit.

Although thirty cars went to the tape, the field was not as large as the original

entry list showed. There were five scratches before the race started. The drivers who had a premonition of the dangers that were seen to be encountered were Erwin and Grover Bergdoll, the brother team in a Benz and Erwin Special, respectively; Tomasini, pilot of the Tomasini Special; Gates, who was slated to handle a Renault, and Francis, up on a Francis-Blackman Special.

The field was sent away at 10:30 o'clock by Starter Wagner in tiers of three, as follows:

Oldfield's Maxwell, Alley's Duesenberg and Gable's Tahis.

Pullen's Mercer, Anderson's Stutz and Ruckstell's Mercer.

Gandy's Edward Special, Cooper's Stutz and Resta's Peugeot.

Nikren's Mercer, Kennedy's Edward Special and Disbrow's Simplex.

Bragg's Californian, Newhouse's Delage and Klien's King.

Rickenbacher's Maxwell, LeCain's Chevrolet and O'Donnell's Duesenberg.

Durant's Chevrolet, Hearne's Case and de Palma's Mercedes.

Parson's Parson special, Wilcox Stutz and Marquis' Bugatti.

Hughes' Ono, Taylor's Alco and Grant's Case.

McKelvy's Overland, Carlson's Maxwell and Gordon's Gordon Special.

#### Clouds Leak; Drivers Slow Up

The clouds were threatening as the cars and drivers lined up for the speed battle, but they did not burst until after about 100 miles had been turned by the leaders.



COOPER IN STUTZ LEADING NEWHOUSE IN DELAGE AROUND CURVE AT THE END OF THE AVENUE OF PALMS. THE TOWER OF JERUSALEM IS IN THE BACKGROUND

On the dry macadam and boards, Resta opened up and at the completion of the twenty-fifth lap was hitting 68 miles an hour and his desperate pursuers were tearing splinters from the planks at a 60-mile an hour clip. Then the nimbus clouds collided and the deluge started. The speed of the leaders dropped 10 miles an hour when the rain came pouring down and the cars began to act unruly. Drivers became cautious and throttled down to 25 miles an hour in taking the turns.

#### Cars Sway Like Tango Artists

In the slippery going, the cars behaved as if their tanks were filled with champagne or bourbon instead of gasoline. It was a race of reels and staggers, slips and skids. Jim Parsons turned completely around in attempting to steer clear of a statue on the course. His car was headed for San Francisco bay of song fame when he brought it to a stop. On another circuit of the course he threw a tire on the turn but was successful in fighting his obdurate mount and drove it around to his pit without further damage.

Lou Gandy figured in the most serious accident of the day of minor misfortunes. He went head-on into a bank of straw and broke his steering gear. Neither he nor his mechanic was injured, however, although their escape was miraculous. Pullen and de Palma went into the hay bulwarks so often that the crowds on the turns began to expect it.

Accidents of this kind were regarded as trivial and the marvel of the race is that nothing really serious occurred. The drivers themselves are amazed that tonight they are all sound and that the race is over without the ominous clang of the ambulance gong sounding once. With the rain, Providence must have sent a Safety First fairy to guard the course.

Ralph de Palma withdrew after completing sixty-seven laps. Although his Mercedes was in condition to continue, he declared that he believed it was foolhardy to take any more chances on the hazardous course. The Italian also was prompted to quit because of the fact that he is after his third successive victory in the Vanderbilt cup race, to be run next Saturday, and he did not wish to injure his prospects by putting his car under the severe strain of today's most strenuous grind.



THREE CALIFORNIA CELEBRITIES AT THE GRAND PRIX—MAYOR RALPH, OF SAN FRANCISCO, SEATED WITH BARNEY OLDFIELD; GOVERNOR JOHNSON STANDING

The withdrawal of Barney Oldfield, Ed Pullen and Ralph de Palma, the prime favorites of the day, turned the race over to the dark horses. Resta had never driven in America before, but he was known to be dangerous through his driving of the Sunbeam at Brooklands and his victory in the 1912 French Coupe l'Auto. Before the start, however, he was not regarded as a probable winner. It was only when he started to consistently lead the field that the spectators woke up to the fact that a newcomer, an invader from Europe, was showing up the American drivers in a new way. He was teaching them the art of wet-weather driving on the curves and showing them dare-devilry par excellence. The manner in which he handled his torpedo-shaped car in the rain and on the slippery roads was a revelation. His daring was splendid. He was absolutely fearless. He drove with the utmost confidence in himself and in his mount.

The other dark horse of the day was Hughie Hughes. Like Resta, he was not a feared competitor before the starting bomb exploded. He was a driver with a reputation, but has done little of note of late. Lord Hughie was only reinstated within a week by the American Automob-

bile Association and he "came back" in a way that left no doubt of his ability.

Hughes was Resta's most dangerous rival in the fight for first money. He was always close up to the driver from across the Atlantic and for ten laps showed the Briton the way. He put the nose of the Ono in front at the start of the eighty-fifth lap and had a lead of a lap and a half on the ninety-fourth circuit of the course when he ran out of gasoline on the back stretch. The mechanic qualified as a sprinter in his race to the pits for fuel, but the lost minutes were far more fleet than Hughie's lithe-limbed helper, and both Resta and Wilcox passed the Ono, gaining an advantage that Hughes never was able to recover. At the finish Wilcox led Hughes by 7 minutes. The difference between second and third prize money was \$500. Thus it can be seen that gasoline is a very expensive commodity on the exposition grounds.

#### Anderson and Disbrow Show Speed

Anderson and Disbrow began to figure in the Big Five only after the fortieth lap was turned. Ed Pullen, winner of the cup in 1914, was running in fourth place before that time and was showing the way to both the Stutz and Simplex at the com-

### CHRONOLOGY OF THE AUTOMOBILE CLUB OF AMERICA'S GRAND PRIZE ROAD RACE

#### FIRST RACE, SAVANNAH, GA., NOVEMBER 26, 1908

402.08 miles; circuit, 25.13 miles

	Time H.M.S.	Av. Speed M.P.H.
1—Flat, Wagner .....	6:10:31	65.08
2—Benz, Hemery .....	6:11:27	64.94
3—Flat, Nazzaro .....	6:18:47	63.64

#### SECOND RACE, SAVANNAH, GA., NOVEMBER 12, 1910

415.2 miles; circuit, 17.3 miles

1—Benz, Bruce-Brown .....	6:03:05	70.55
2—Benz, Hemery .....	6:03:06	70.55
3—Marquette-Bulck, Burman .....	6:11:23	66.67

#### THIRD RACE, SAVANNAH, GA., NOVEMBER 30, 1911

411.36 miles; circuit, 17.14 miles

1—Flat, Bruce-Brown .....	5:31:29.15	74.45
2—Benz, Hearne .....	5:33:33.07	74.00
3—Mercedes, De Palma .....	5:34:40.08	73.74

#### FOURTH RACE, MILWAUKEE, WIS., OCTOBER 5, 1912

409 miles, 4,616 feet; circuit, 7.882 miles

	Time H.M.S.	Av. Speed M.P.H.
1—Flat, Bragg .....	5:59:27.44	69.3
2—Benz, Bergdoll .....	6:14:51.38	65.51
3—Stutz, Anderson .....	6:15:22.47	65.60

#### FIFTH RACE, SANTA MONICA, CAL., FEBRUARY 23, 1914

403.248 miles; circuit, 8.4 miles

1—Mercer, Pullen .....	5:13:30	77.2
2—Marmon, Ball .....	5:53:23	68.4
3—Alco, Taylor .....	6:08:29	65.66

#### SIXTH RACE, SAN FRANCISCO, CAL., FEBRUARY 27, 1915

400.28 miles; circuit, 3.84 miles

1—Peugeot, Resta .....	7:07:57	57.5
2—Stutz, Wilcox .....	7:14:36	55.25
3—Ono, Hughes .....	7:21:46	54.25



pletion of its sixtieth circuit. Pullen withdrew on his seventy-second lap, however, and this gave Anderson and Disbrow their opportunity to cut into the prize money. They both drove furiously and reeled off lap after lap at a heart-breaking clip near the end. At first, the officials gave Disbrow fourth place, but after the tables were rechecked, he was relegated to fifth and the Stutz was put forward to fourth in the order of finish.

Resta's Victory Upholds Tradition

The victory of Resta and the Peugeot is in keeping with grand prize tradition, for foreign-built cars have won it five out of the six times that it has been contested for, counting today's battle in the mud and rain. The lone American triumph was scored last February, when Eddie Pullen, pilot of the Mercer, captured the international trophy at Santa Monica. Previous to 1914, the winners were Caleb Bragg in

an Italian Fiat in 1912; the late David Bruce-Brown in a Fiat in 1911, and a German Benz in 1910, and Louis Wagner in a Fiat in 1909.

The wet course and the consequent slow time made the grand prize contest of 1915 one of the easiest races on tires ever held on the coast. After the rain commenced to fall, stops to change casings were very few and far between. The pit attendants had very little to do after they had covered the gasoline, tools, tires and spare equipment with canvas or other material and sat huddled in overcoats and sweaters and under raised umbrellas. The energy that they might have spent working the jacks and tire tools was exhausted in dodging rain drops.

Most of the drivers that went out simply quit. Rain put the Maxwell out of commission, the air intake of the carbureter, which projects outside of the

hood, catching the water and fouling the spark plugs. Earl Cooper retired when the web that holds the center bearing in the crankcase of the Stutz broke. It was well that he abandoned the race as he was in no condition to drive. Mrs. Cooper was ill at the hotel and Earl had been up with her all night. He, too, was sick before the start of the race from loss of sleep and nervousness but gamely refused to withdraw. Two of the laps that he made were among the three fastest of the day.

Hughie Hughes drove a wonderful race, using his head as well as his hands. The Ono proved to be a well-balanced car and held exceedingly well to the slippery roads. It was equipped with nonskid tires. The Ono also showed more speed than was expected of it and its showing was one of the surprises of the day. Had not Hughes ran out of gasoline when he did, it is probable that he would have given Resta a wheel to wheel and hood to hood fight to the finishing line and cut in for a bigger piece of the prize money.

When it started to rain, Howdy Wilcox put on non-skid tires but after a few laps, came in and changed back to his original cords.

Although he was announced as a driver of the Case, Bob Burman did not start. He came to San Francisco intending to take the mount but could not reach an agreement with Alex Sloan, manager of the Case team, and Harry Grant was signed instead.

A Success, Yet a Failure

As a racing spectacle, the grand prize of 1915 was both a failure and a success. Surely, spectators never were treated to more thrilling sights on any motor course. Cars skidded and dipped with all the verve and dash of tango artists. Frequently, they would disappear entirely, enveloped in a shower of mud and water as they tore through a small lake. Over the boarded portion of the course the cars bounced and throbbed as though shaken from beneath by a colossal vibrator. As the water ran under the planks, each machine was sprayed by a miniature geyser shooting through the cracks.

Several drivers were too exhausted to continue the race and relief pilots had an opportunity to get a mud bath. All the drivers complained of terrific headaches caused by the rain beating in their faces. The endurance, hardiness and gameness of the contenders who stuck it out to the finish was appreciated in a small way by the drizzled spectators who sat through the downpour for eight or more hours.

As far as the management and talent went, the grand prize was a success, but when the weather conditions and consequent trials to drivers and spectators are considered, it was a damp, dismal failure.

The race attracted a huge crowd. The official attendance was given at 68,000 persons and had the weather been auspicious, the contest would have been one of the most notable events in the history of the sport of motor car racing.

EQUIPMENT OF THE CARS CONTESTING IN THE GRAND PRIZE

Car	Driver	Carbureter	Magneto	Plugs	Tires	Oil	Wheels
Chevrolet	Durant	Master	Bosch	Bosch	Nassau	Oilzum	Houk
Mercedes	DePalma	Rayfield	Bosch	Bosch	Nassau	Monogram	Rudge
Peugeot	Resta	Master	Bosch	Bosch	Nassau	Oilzum	Rudge
Alco	Taylor	Master	Bosch	Bosch	Hendrie	Havoline	Houk
Mercer	Pullen	Rayfield	Bosch	Bosch	Silverton	Oilzum	Rudge
Californian	Bragg	Rayfield	Bosch	Bosch	{ Silverton } Palmer	Oilzum	Rudge
Maxwell	Rickenbacher	Harroun	Bosch	Bosch	Nassau	Oilzum	Houk
Stutz	Cooper	Schebler	Bosch	Bosch	Firestone	Motoreze	Rudge
Buggatti	Marquis	Master	Bosch	Bosch	Hardman	Oilzum	Rudge
Mercer	Ruckstall	Rayfield	Bosch	Bosch	{ Silverton } Palmer	Oilzum	Rudge
Delage	Newhouse	Master	Bosch	Bosch	Firestone	Motoreze	Rudge
Edwards Sp.	Gandy	Master	Bosch	Bosch	Silverton	Motoreze	Houk
Maxwell	Carlson	Harroun	Bosch	Bosch	Silverton	Oilzum	Houk
Parsons Sp.	Parsons	Master	Bosch	Bosch	Firestone	Oilzum	Wood
Edwards Sp.	Kennedy	Master	Bosch	Bosch	Silverton	Motoreze	Houk
Erwin Sp.	Bergdoll	Master	Bosch	Bosch	Silverton	Oilzum	Rudge
Mercer	Nikrent	Rayfield	Bosch	Bosch	{ Silverton } Palmer	Oilzum	Rudge
Hercules	Hall	Master	Bosch	Bosch	Hercules	Motoreze	Houk
Tahis	Gable	Master	Bosch	Bosch	Michellin	Oilzum	Wood
Tomasini	Tomasini	Wrecked in practice; out.					
Duesenberg	Alley	Master	Bosch	Bosch	Riverside	Oilzum	Wood
Stutz	Wilcox	Schebler	Bosch	Bosch	Silverton	Monogram	Houk
King	Klein	Rayfield	Bosch	Bosch	Firestone	Oilzum	Rudge
Simplex	Disbrow	Rayfield	Bosch	Bosch	Silverton	Oilzum	Rudge
Gordon Sp.	Gordon	Master	Bosch	Bosch	Nassau	Oilzum	Houk
Chevrolet	LeCain	Master	Bosch	Bosch	Nassau	Oilzum	Houk
Case	Grant	Master	Bosch	Bosch	Silverton	Oilzum	McCue
Duesenberg	O'Donnell	Master	Bosch	Bosch	Riverside	Monogram	Houk
Stutz	Anderson	Rayfield	Bosch	Bosch	Silverton	Monogram	Houk
Ono	Hughes	Master	Bosch	Bosch	Firestone	Oilzum	Wood
Marmon	D'Alene	Entry scratched					
Overland	McKelvey	Schebler	Bosch	Bosch	Fisk	Autoline	Houk



LOUIS DISBROW FITS TIRE CHAINS ON HIS SIMPLEX



# Uncle Sam Finds New Method of Making Gasoline

Government Reports Discovery of Way to Triple Production of Fuel—  
Will Patent and Give to the American People

WASHINGTON, D. C., March 2—Special telegram—Full details of Dr. Rittman's new chemical process for increasing the supply of gasoline through his new formula, will be made public by the department of interior late in March. Rittman today said that in his process all of the oil is vaporized and the vapors proceed downward, the function of treating the oil not to exceed the boiling point. The Rittman process, it is understood, will work on all oil residue. Dr. Rittman made it plain that he had a profound respect for the Burton process, this being recognized as the leading practice today in the production of gasoline.

WASHINGTON, D. C., Feb. 29—Secretary of the Interior Lane today announced the discovery by the United States bureau of mines of two chemical processes, one of which, it is claimed, will be of tremendous importance to the oil industry, greatly increasing the supply of gasoline, while the other may make the United States absolutely independent of the rest of the world in regard to important materials necessary for the dye industry and the manufacture of high explosives used in warfare and in engineering operations.

The first of these processes promises to enable the independent refiners in this country to increase their output of gasoline from petroleum 200 per cent or more. With an estimated production on the part of the independent refiners of 12,000,000 barrels of gasoline in a year, this will mean an output from the independents alone of 36,000,000 barrels, greater than the total production today from all sources.

## The Second Process

The second process includes the manufacture from crude petroleum of what is known chemically as toluol and benzol, both of which heretofore have been obtained from coal tar. As Germany has specialized far beyond other countries in by-products from coal, the United States and the rest of the world have been dominated by that country as regards those products of toluol and benzol, which are the important bases for the production of dye stuffs and high explosives, and especially smokeless powder.

The discoverer of these two valuable processes, after many years of research, is Dr. Walter F. Rittman, chemical engineer of the bureau of mines, the work having been done at Columbia university, New York, the facilities of the laboratory there having been turned over to the federal government by President Nicholas Murray Butler.

Application has been made by Dr. Rittman, on behalf of the federal government, to patent these processes in order to prevent any monopoly in their use, the patents to be dedicated to the whole American people.

"These processes," said Secretary Lane today, "are fraught with the utmost importance to the people of this country. For some time the Standard Oil Co., through the great amount of money at its com-

mand, through its employment of expert chemists and through its extensive organization, has had a big advantage over the independents in the production of gasoline, this company having a patented process that obtains for it as much as three times the amount of gasoline from a given quantity of petroleum as the independents now obtain. There are two or three other large corporations that have an efficient process for the manufacture of gasoline, but the independents as a whole have never been able even to approach the results obtained by the Standard Oil Co.

"Now the federal government, through the efforts of the Dr. Rittman, proposes to make free for the use of all of the people of this country who wish it, a process that is confidently expected to increase their yields of gasoline from crude petroleum fully 200 per cent and perhaps more, such results having been obtained repeatedly in the laboratory. It is claimed by Dr. Rittman that his process is safer, simpler and is more economical in time than processes now in use and these are economic factors of great importance.

"With a steadily increasing demand for gasoline for motor cars, motor boats and engines, this fortunate discovery comes at the proper time. It is but 2 years ago that the motor industry, fearful that the supply of gasoline might not be adequate for its rapidly expanding business, offered through the International Association of Recognized Automobile Clubs, a prize of \$100,000 for a substitute for gasoline that would cost less than gasoline. Happily the urgency of this situation has passed and at the present time there is a plentiful supply of motor fuel to meet immediate demand.

"This new process adds to the hope, that in spite of the wonderful growth in the use of gasoline, there may not be any shortage in the future. It indicates an increased production of gasoline from the present production of petroleum—an output of 50,000,000 barrels instead of 25,000,000, as under the present methods. It will render free for use to all, the results of that efficient and intelligent research which heretofore has been at the command of only the wealthy. I am led to believe that it will not only be of inestimable value to the refiners commanding but limited capital as well as those of wealth, but also to the hundreds of thousands of users

of gasoline. When it is realized that the gasoline industry each year in this country yields products amounting in value to between \$100,000,000 and \$150,000,000, the importance of this discovery is seen.

## To Cope With Germany

"The second process discovered by Dr. Rittman may prove of much more value to the country than the first, in that it suggests the establishment of an industry in which Germany heretofore has been pre-eminent—the dye industry, and also promises indirectly a measure of national safety of incalculable import. Among necessary ingredients of high explosives used in modern warfare toluol and benzol are in the first rank. Heretofore these products have been obtained mainly in Germany and England from coal tar, and the explosive manufacturers have had to depend largely on the supply from these sources in the making of explosives. I understand that some toluol and benzol have been obtained from American coal and water-gas tars, but this supply does not begin to satisfy the present demands. The federal government now proposes to obtain the toluol and benzol from crude petroleum also. I am further informed that these products can be produced from practically any American petroleum and that the supply can be made sufficient not only for the entire American trade but also for other purposes.

"This process has gone far enough to indicate that the two products can be produced at a reasonable cost. The real comforting thing, however, is that we have the knowledge that this new source of supply is at the command of our people, and that in time of great national stress, if the nation is ever called upon to defend itself, we will be able to manufacture the most efficient and most powerful explosives known in warfare. Were it not for this discovery, it is possible that in such an emergency, we might be compelled to rely largely on the greatly inferior explosives that were used in the time of our civil war and this would spell national disaster.

"Dr. Rittman concludes from his experiments that this process may become more economical than the German method of obtaining these products from coal tar, as this process not only makes toluol and benzol, but also gasoline in considerable quantities. He intimated to me the possi-

bility of the value of the gasoline being an important factor in paying the costs of the process. If this should prove to be true, it may result in eventually giving the United States a supremacy in the dye-stuffs industry that has for some time belonged to Germany, since toluol and benzol are the source of many of these important dye stuffs that are used in the silk, cotton and woolen industries. It would also tend to prevent disturbance of the great industries engaged in the manufacture of silks, cottons and woolens in such extraordinary times as we are now experiencing, for we would be able to supply them with the necessary dyes."

#### JANUARY TRUCK EXPORTS

Washington, D. C., March 2—Government figures made public today show that 935 motor trucks valued at \$2,545,527 were exported in January as against forty-four trucks, valued at \$77,491, shipped abroad in same month last year. Exports of passenger cars dropped from 2,481 valued at \$2,174,392, in January, 1914 to 1,803, valued at \$1,313,153 in January last. Figures show that truck exports to warring nations in Europe are growing by leaps and bounds. These figures are said to be among the most important issued since the war began.

#### CHICAGO TO CLEAR THE LOOP

Chicago, March 2—The city council last night passed an ordinance which prohibits the leaving of motor cars on the streets inside the loop or business district more than 30 minutes at a time, whereas formerly an hour was the limit. The measure goes into effect March 10 and Captain Healey of the traffic squad says it will be enforced. The new law applies alike to the owner who drives his own car, to the man with the chauffeur and to the motor truck. Captain Healey's statistics show that on an average 2,054 cars a day are left from 3 to 8 hours on the loop streets.

#### SAFETY-FIRST FEDERATION FORMED

New York, Feb. 26—The Safety First Federation of America, which has for its objects uniform laws for control of a motor traffic and improvement of street traffic and improvement of street traffic conditions throughout the country by a standard system of supervision, was organized yesterday by delegates who met at 6 East Thirty-ninth street, this city.

The motto of the federation is conservation of life, limb and property, and its object is to procure legislation toward this end in all of the states and Canada. Another general meeting of the federation is to be held in Detroit in September, when a number of Canadian organizations will be admitted to membership. Thereafter conventions are to be held annually.

At today's meeting officers and directors were elected. The board of directors includes police commissioners, representatives of motor clubs, and civic organiza-

tions from fourteen cities. The officers elected were as follows:

Vice-presidents—Police Commissioner H. W. Newman, of New Orleans; C. M. Talbert, director of streets, St. Louis; Police Commissioner, John Gillespie, Detroit; J. H. Lippincott, New Jersey traffic commission; treasurer, C. L. Bernheimer, executive secretary, F. H. Elliott, New York city.

A committee was appointed to nominate a president for election at the next meeting at Detroit in September.

#### NEW JEFFERY ARMORED CAR

Kenosha, Wis., March 2—Capable of a speed of 35 miles an hour in either direction, a four-wheel driven, steered and braked 2-ton chassis has been built espe-

cially by the Thomas B. Jeffery Co., Kenosha, Wis., for armored car work for the allied governments. It is a stock Jeffery except that the steering, clutch and brake controls are duplicated at the rear end, with a seat for a second steersman. The front driver is located at the side of the engine, and the radiator is swung very low. The regular reverse has been changed into a fourth speed, and a reverse for all speeds placed on the driving shaft head. This reverse is operated by a third lever.

All gear-changing and motor control, including Bijur electric starter are located in the front cab, an electric buzzer serving as a signal from the man in back. This chassis is shortly to be shipped abroad, being now demonstrated in New York city.

## Prospects Dark for Vanderbilt Cup

### Drivers Object to Starting in Classic

SAN FRANCISCO, Cal., March 1—Special telegram—Unless there is a change of feeling among the drivers between now and Saturday, the Vanderbilt cup race, to be run over the Panama-Pacific exposition course March 6, will be a huge farce and the premier motor contest of America will be a comedy of laughs instead of a struggle of thrills.

At the completion of the water-soaked grand prize race, many of the drivers declared that they would not start in the Vanderbilt cup classic and threatened to leave San Francisco immediately. They will be compelled to remain, however, and start Saturday under penalty of being suspended by the American Automobile Association if they do not. Had they given formal notice of their withdrawal from the lists immediately after the announcement of the postponement of the Vanderbilt cup race from February 22 to March 6, they would have been safe and the governing body could not disqualify them.

The drivers claim that the course is unfit for racing. They criticize the A. A. A. for sanctioning the races under the existing conditions. Many of the rebellious pilots, forced by the A. A. A. contest board to remain here and start, say that they will drive one lap in order to save their entry fees and then withdraw as they did in the grand prize of Saturday.

Despite the storm of protests and the existing dissatisfaction, the list of starters in the Vanderbilt cup race Saturday will be the same as that announced for February 22 with three exceptions. Erwin Bergdall has been released by the management and has shipped the Erwin Special and the Benz, a reserve car, to Philadelphia. Bergdall was injured in practice when his car went through the fence.

Tomasini may not be allowed to start as the other drivers claim that he is not capable. The Renault, formerly owned by Barney Oldfield and now the property of

Ivan R. Gates, of San Francisco, also has been withdrawn. It was not permitted to compete for the grand prize as it was regarded as dangerous.

#### CHASSAGNE TO RACE HERE

Indianapolis, Ind., March 2—Darius Resta having switched from a Sunbeam to a Peugeot for the 500-mile Indianapolis race, it is announced today by the local speedway management that Jean Chassagne has been substituted for the American grand prix winner. Chassagne, it will be remembered, drove a Sunbeam in last year's race. Since the war broke out he has been serving as artillery man in a naval fort at Marseilles, with no prospect of release. But the switch of Resta evidently brought about the necessary pressure, for the holder of the world's 1-hour record has been given a furlough and will be here for the big race.

The first accessory prize for the next Indianapolis 500-mile race is made by the Emil Grossman Co., of New York, which offers \$1,000 to the winner, provided Red Head spark plugs are used exclusively throughout the contest.

#### MORE BIG EVENTS SANCTIONED

New York, Feb. 27—The latest announcement made by the contest board of the American Automobile Association shows that Chairman Kennerdell has straightened out the controversy that has waged among the promoters at Tacoma, Sioux City and Omaha over the national holiday. Sioux City has been given July 3, Tacoma July 4 and Omaha July 5. Besides these, the A. A. A. has listed road races at Tucson, Ariz., on March 20; Oklahoma City on April 20-22; Visalia, Calif., on July 4, and at Denver on July 30. Big dirt track races are scheduled at Galesburg, Ill., on June 9; at Burlington, Ia., on July 9; at Janesville, Wis., on August 14, and at Kalama-zoo, Mich., on September 6.





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## Developing a Motor Sense

**E**XPERT motor car drivers sometimes are credited with having acquired a sixth sense, a subtle pre-knowledge of what is about to happen, which is not vouchsafed their fellows of lesser ability at the wheel. By such prescience are explained the many evidences of rapid-fire thinking and action by which a turn of the steering wheel, an application of the brake or pressure on the accelerator at the right instant has averted what otherwise would have been a serious accident.

**B**UT it is not the acquisition or gift of a sixth sense that is displayed in such cases. It is by the proper development of the five senses with which all of us are blessed and the training of the mind and muscles and nerves to translate the impressions received by the senses automatically into action without conscious thought. The cyclist who pursues a wobbly and disastrous course in maintaining the equilibrium of his first attempts, by concentration soon finds that balance and control come automatically.

**I**N just the same way can the eye, the foot and the hand of the motorist be trained to work in harmony and automatically. Every expert driver has given himself this training—usually unconsciously—and we consider him a born driver. But any motorist can in great degree acquire this correlation of the eye and brain and muscle by making the effort during his daily drives.

**T**RAINING of the eyes is the most important phase of this development of what often is called intuition, which will assure that the right thing is done at exactly the proper moment. The chief thing is to train the eye to act, as an English writer puts it, on the offensive rather than on the defensive. By this, he means that the eye can be and should be taught to seek hindrances and dangers to the progress of the car, rather than that it should wait till the obstruction or condition becomes apparent through its very size or immediateness. This

can be accomplished by carrying a definite set of conditions in the mind for a few weeks while driving, after which the eye or brain will take care of the matter without further thought.

**J**UST what these things should be depends to some extent upon the conditions of the road and traffic under which one is driving. However, a definite instance will serve to illustrate what is meant and point to numerous others of equal importance. The everyday motorist, bowling along over a fine asphalt or macadam street, meets a truck; his eye sees the truck; he gives it a fair passing margin. If, as ordinarily is the case, there is nothing behind the truck, all goes well. But imagine the not impossible assumption of a boy stealing a ride, a cyclist saving his legs, or, perhaps, another motorist immediately behind. Any one of the three might at the moment of passing take it into his head to swing out into the road.

**F**IRST, the eye must perceive the altered condition, then it must be transmitted to the brain, then must come the decision whether to turn out, apply the brakes, or what should be done. Next, the nerves must send the message to the proper muscles of the hands, arms and legs. The driver then has to get his hand to the horn, turn the steering wheel, press on clutch and brake pedals. This has taken time, and in a situation where an inch means safety or injury, hundredths of a second count.

**A**SSUME a driver who has trained his eyes to become alert the moment it perceives the truck for the possible boy, cyclist, roller skater or car behind. Unconsciously, the approach will be moderated somewhat, probably a wider margin will be given the truck. Toes will be on tensed clutch and brake pedals, hands will be ready for horn and steering wheel—all without conscious effort—and the instant there is the first indication of the emergence of anything from behind the truck, the proper action is instantaneous, for the wires have been cleared for the expected danger signal.

## Government in Fuel Field

**A**NNOUNCEMENT of the new method of producing gasoline by which three times the quantity now generally obtained may be derived from the crude petroleum has a dual significance. While the mere statement that such an increased production has been made possible is worthy of all the interest it is arousing among motorists, what is basically more important is that Dr. Rittman's discovery, coming as it does from one of the departments of the government has been thrown open to the use of everyone by the federal authorities in patenting the process and offering it to the country at large.

**I**T need not be expected that the new process will greatly increase the number of the refiners in the field, because any means of converting the crude oil into marketable refined products requires equipment and plants that involve an enormous outlay of capital. Nevertheless, the discovery, if it proves all the claims made in

the first blush of achievement, will tend to some extent toward limiting the control with which the Standard Oil Co. is in some quarters charged with exercising. The resources in money and talent that that company has at hand has permitted it to develop processes of refining and utilization of by-products which are not at the command of the smaller independent refiners. The more efficient production of fuels and other products of the crude has given that company a manufacturing and sales advantage not enjoyed by the smaller concerns.

**T**HUS the discovery of the bureau of mines may result in cutting down this advantage, and place all refiners on a more equal footing, with consequent advantage to motorists as a whole. The suggestion that the government use the profits from the increased production of fuel in the manufacture of the explosives has an element of romance in it.



# Texas Court Calls Car Stealing Only a Misdemeanor

## Decision Holds Such a Theft Is Not a Felony

*In the commonwealth of Texas  
Where the piebald bronchos lope.  
To rebrand another's cattle  
Is to dangle from a rope;  
Stealing horses is to order  
A hemp necktie for your throat,  
But to steal a motor car  
Is safer yet by far  
Than to swipe a pig  
Or grab your neighbor's goat.*

AUSTIN, Tex., Feb. 27—It is not a felony to steal a motor car in Texas, according to the decision of the state court of criminal appeals in the case of R. R. Sparks from Clay county. Sparks was convicted of theft of a car, valued at more than \$1,000, and was given 2 years in the penitentiary. An appeal was taken to the higher court which in its opinion, just rendered, says:

The facts clearly justified the jury in finding Sparks guilty of theft of the motor car. The sole question we deem it necessary to discuss is whether the theft of a car of value in excess of \$50 is a felony, as is the theft of other personal property, or has the legislature by section 1, chapter 100, acts of the thirty-third legislature, singled out the theft of several articles of personal property and made it a misdemeanor to steal them.

The writer can hardly conceive that the legislature intended to make the theft of a \$1,000 or \$5,000 car a misdemeanor and theft of a \$10 or \$20 hog or goat a felony. But such is the plain letter of the statute as enacted by it, for section 1, chapter 100, acts of thirty-third legislature, provides that "Whoever shall steal any motor vehicle, if the value is \$35 or more, shall be imprisoned in the county jail for not less than 6 months nor more than 1 year." Was the language ambiguous and susceptible of no other construction, we would hesitate long before so declaring the law to be, but as the language is plain and subject to no other construction, this court cannot legislate nor has it authority to annul an act of the legislature by unwarranted interpretation of construction, no matter how unwise we might think such legislation to be.

Under the code we can only call the attention of the legislature to these unseemly, unjust and unequal provisions of the code and suggest that the punishment for theft of a motor car and other vehicles be made equal and uniform with the theft of other personal property of equivalent value.

The district court of Clay county is instructed to transfer the case to a court in that county having jurisdiction in misdemeanor cases.

### WOULD INCREASE HORSE TAX

Hartford, Conn., Feb. 27—The legislature is considering a measure which doubles the present registration fee but eliminates the vehicle from any other form of taxation in the cities or towns of the state. In connection with this it is proposed that the tax on horses be increased. The Sherwood bill fixes taxation as follows: Motorcycles, \$4 each; commercial cars, \$14 for the first 1,000 pounds and \$6 for each 1,000 pounds or fraction; livery cars, \$20; dealers' cars, \$100; dealers' motorcycles, \$20, and all other motor cars \$1 for each horsepower which is of course just double the present fee.

Representative Russell has sprung a horse tax bill. He states he owns pleasure cars and trucks and that the latter should be taxed heavier because of the damage they do to the roads. He proposed a sub-

stitute measure taxing horses for the damage they do rather than increasing the tax on cars. Such opposition as developed came from the smaller and more remote towns.

### GASOLINE PRICES DROP

Milwaukee, Wis., March 1—Further reductions in gasoline prices were announced in Milwaukee on February 25 and motorists who have formed the habit of running their cars to the numerous downtown filling stations operated by the Standard and independent companies are expecting a season of operation considerably less expensive than a year ago. It is believed that the exceedingly close competition among the filling stations is responsible for this reduction, which is the second since January 1, 1915. Comparative quo-

tations for tank wagon delivery, which prices also govern retail sales at filling stations, are as follows:

	Feb. 25, 1915	Jan. 18, 1915	July 1, 1914
Test	Cents	Cents	Cents
60.....	10 1/4	11	11 1/4
65.....	13	13	15
70.....	15	15	17 1/4
72.....	16	16	19

Garages are charging 2 cents over the above scale but, mainly of their own accord, are doing little business, excepting in emergency cases. Garagemen say they do not care to handle the fuel excepting for their own uses and purposes, because of the inability to make any money out of it. Practically the only business they now get is from owners who store their cars in garages and feel obliged to patronize the garage for supplies, and from drivers who are nearly dry and want enough gas to get to their usual supply stations.

# See America First —

# See America Now



EDITOR'S NOTE—This is the sixteenth of a series of illustrations and thumbnail sketches of the scenic and historic wonders of America to be run in Motor Age with the idea of calling the attention of motorists to the picturesque points of interest in their own country.

No. 16—THE CLOISTERS AT LANCASTER, PA.

A series of old buildings known as the Cloisters, situated on the road between Reading and Lancaster, Pa., at a little town called Ephrata, is an object of interest for tourists. The people who built them were called the Seven-Day Adventists, who believed in a common treasury. They all put their moneys into one place and everybody lived together like one big family. The buildings are very curiously constructed. At the battle of Brandywine, General George Washington had many of his wounded soldiers in these buildings and many tracings of soldiery are still to be seen.

# Court Holds Chalmers No Infringer of Baker Patents

## Decision in American Ball Bearing Co. Suit

CLEVELAND, O., March 1—In an opinion just rendered, Judge John H. Clarke, in the United States district court, upheld the prior art claims of the defense in action of the American Ball Bearing Co. against Edward B. Finch, former Cleveland representative of the Chalmers Motor Co. He refused to grant an injunction or damages for what the complaint alleged as infringement of patent issued to Walter C. Baker, of the Baker Electric Vehicle Co., and the American Ball Bearing Co.

The American Ball Bearing Co. started the suit in March, 1913, and the concern stated at that time the defendant was selling Chalmers cars which used certain anti-friction bearings which, it was claimed, infringed patents issued to Walter C. Baker and assigned to the American Ball Bearing Co. The patent has to do with the efficiency of the steering axle of a motor car. The final hearing came before the court in January, 1915.

Judge Clarke reviewed the evidence at length, with the statement that: "The only question I shall consider is: 'Is the combination of the patent such as have required inventive genius to develop it in a mind informed in the art to which it relates at the time the patent was applied for in February, 1902?'"

"The desirability and importance of bringing the steering knuckle as closely as practical to the hub and to the plane of the tread were perfectly understood prior to 1902. Such appears in the testimony of Professor Carpenter, expert witness for the plaintiff and in that of Mr. Baker and is clearly shown by the Faure patent, 591,595, in 1897; by the Clubbe and Southey patent, 621,017 in 1898 and by the Knudsen reissued patent, 11,721.

"Thus it is clear that the locating of the steering knuckle was actually practiced prior to 1902.

"The Robinson patent, 509,866 in 1893 has for its object the improving and simplifying of the construction of ball bearings for vehicles and the drawing of this patent clearly show the anti-friction balls near the outer and inner ends of the spindle, the larger ones being nearer the inner end.

"Professor Carpenter said: 'It would be idle for me to take the stand that Mr. Baker was the first to employ anti-friction bearings in the spindle of a steering axle, nor does the Baker patent assert that he was the first to do so.'

"He said it was the general practice prior to 1902 where a load shaft was supported by bearings at the two ends, to vary the sizes of these bearings according to the location of the load along the length of the shaft.

"Artillery wheels, too, the evidence

shows, were in general use before even the advent of the motor car.

"It seems clear that not only were all of the features of the claimant combination familiar to persons skilled in the art of 1902 or even in 1898 but that the arrangement as provided in the Baker patent and the reason for such adjustment would seem to have been obvious.

"It seems clear that the various elements of the Baker patent are not so grouped as to produce any new or useful result. The knuckle close to the plane of the wheel produces the same effect in the Baker construction as it did in the Panhard of 1902, a model of which was offered in evidence. At best it is a slight carrying forward of ideas which the state of prior art shows were common among men skilled in it.

"This conclusion involving as it does the finding that the patent suit is void for want of patentable novelty and invention makes necessary the consideration of the many other questions started upon the record in this case."

### WEIDELY MOTOR CO. INCORPORATES

Indianapolis, Ind., March 1—With an authorized capitalization of \$100,000, the Weidely Motor Co. has been organized and incorporated here to manufacture the Weidely motor designed by George A. Weidely, former vice-president and designer for the Premier Motor Mfg. Co. A factory building at 133 to 143 West South street has been occupied. Officers of the company are: President, W. E. Showers; vice-president and general manager, George A. Weidely; treasurer, W. A. Humphrey; secretary, L. A. Poundstone. Edmund Rosenberg and the officers comprise the board of directors.

### SUES PEERLESS FOR COMMISSIONS

Cleveland, O., March 1—Suit asking \$800,000, alleged to be due from the Peerless Motor Car Co. as commissions on an \$8,000,000 war truck order with the British government, was filed Friday, in common pleas court, Cleveland, by Henry S. Chapman.

Chapman, who is now in England, charges in his petition that he was to receive 10 per cent of the contract price of the trucks, but that after he had submitted proposals to the British government, the president of the Peerless company went to England and closed the contract, without his knowledge or consent.

George B. Siddall, secretary and attorney for the Peerless company, declared that Chapman has no claim on the company. He said Chapman and a number of others endeavored to secure the British contract on a commission basis, but failed.

He says the contract was finally secured by an English importing firm and given to the Peerless company.

This contract, the suit alleges, "was for the sale of all motor trucks on hand, and its entire output of trucks not previously sold up to June 1, 1915. The approximate number of trucks delivered and to be delivered, Chapman alleges, is 1,800, and the total purchase price which the Peerless company has received, or will receive, he says, is \$8,000,000.

"Chapman never had any contract with the Peerless company," declared Attorney Siddall. "Chapman, like many others, was told that if he could get a contract with the English government they would be given a commission. He tried to secure one but failed. He was not the only one who tried to secure contracts. He was not given the exclusive sales right for England. Our contract is not with the British government."

### LOZIER BRINGS OUT NEW MODEL

Detroit, Mich., Feb. 26—Within the next 2 weeks the new owners of the Lozier Motor Co., will place on the market a new Lozier car which will have all the features and characteristics of the former Lozier models. The price will be between \$1,800 and \$2,000. The big six and the four which were made before the company went into bankruptcy also are to be continued by the new management.

At the present time about 175 men are being employed and the force will be gradually increased. W. G. Thomas, formerly with the Pierce-Arrow, E. R. Thomas and Packard companies has been appointed production manager. H. N. Williams, who has been with the Lozier organization for many years, is in charge of the service and sales department. Many of the former Lozier dealers will continue to handle the Lozier cars. There will be no resumption of operation of the former Lozier plant in Plattsburg, N. Y. This property will be sold. All production and service activities are concentrated in the local plant.

### NEW TIRE COMPANY STARTS

Trenton, N. J., Feb. 26—The formal opening of the plant of the Delion Tire and Rubber Co., this city, took place this afternoon with speeches by Senator Leavett, of Mercer county, and Major L. N. Clayton. The Delion is the eighth rubber tire plant to locate in Trenton, making this city next to Akron in the matter of numbers and importance in the tire industry.

The plant is of the latest construction throughout, consisting of brick and concrete, the size of the factory being 238 by 75 feet with two floors. The latest tire-



making machinery and labor-saving devices are used. The company will produce about 400 tires and 600 tubes a day when working on full time and will employ 300 men. No hard rubber tires will be manufactured. Delion tires will carry a guaranteed mileage of 4,000 miles. Active manufacturing will start March 1.

The officers and directors of the company are: H. H. Coleman, of Newark, president; F. J. Wetzel, of Trenton, vice-president; G. H. Graham, Jr., secretary and assistant treasurer; directors, Charles R. Whitehead, of Morristown; L. B. Tompkins, Morristown; Manuel Llora, F. G. Hasselman and W. T. Rock, of New York City; Warren A. Clapp, of East Orange, and Lionel Emdin, of New York city. Mr. Emdin will also be general sales manager, with headquarters in a new store at 1791 Broadway, New York city. The company was incorporated in 1913, with a capital of \$500,000 and recently raised that to \$750,000.

#### HOLDS HEAD OF FAMILY RESPONSIBLE

Denver, Colo., Feb. 24—A verdict holding the head of a family responsible for an accident caused by a motor car owned by the wife or other member of the family has just been rendered by a jury in Judge C. C. Butler's division of the Denver district court. The jury also awarded the plaintiff \$3,750 damages for injury, which is said to be the largest amount ever allowed in Denver in a motor accident case. The suit was brought against Mr. and Mrs. Ben Kemper by John A. McIntyre for injuries caused by Mrs. Kemper's electric car, which she was driving at the time of the accident and which she also personally owns. Mr. Kemper's defense against responsibility was based on the ground that his only connection with the accident or with the ownership of the car itself was through having bought the car and given it to his wife as a present.

Mr. Kemper's lawyers have filed a motion for a new trial, and if this is denied they threaten to carry the case to the state supreme court.

#### STUDEBAKER REPORT OUT

South Bend, Ind., March 1—The fourth annual report of the directors of the Studebaker Corp. of South Bend, and its subsidiary companies for the year ending December 31, 1914, has just been given out. According to the report the net profit for the year derived from the regular business after the deduction of increased depreciation allowances and the payment of interest amounted to \$4,441,966.16. The net profits for 1913 were \$1,772,473.65. The 1914 profits therefore show an increase over the previous year of \$2,669,492.51 or 150.6 per cent.

After the payment of regular dividends on preferred stock and the transfer to the special surplus account of the amount to be set aside therein under the terms of the corporation's charter the balance of the profits of \$3,165,983.11 was added to the

surplus and this account showed a total credit as of December 31, 1914, of \$5,265,819.45. The special surplus account showed a balance of \$1,230,747.54.

The report states that the corporation's net profits gave it a return of 12.8 per cent on the outstanding common stock after deducting the payment of 7 per cent preferred stock dividends. This showing is against a return in 1913 of 3.1 per cent. Rather than use any of the profits for the payment of dividends on the stock the directors believed it would be the wiser policy to devote the profits to the payment of debts and to the increase of the cash balance. Following this policy resulted in

a debt reduction of \$4,168,978.98 and an increase of \$1,581,703.05 in the cash on hand making a total improvement in this respect of \$5,750,682.03 for the year.

The total sales for the year were again the largest in the history of the business, amounting to \$43,444,223.41 as compared with \$51,464,949.82 for 1913, an increase of 4.8 per cent. The sales in the motor car division for the first 9 months of 1914 were much greater than during the same period of 1913. The shipments in 1914 amounted to 36,430 cars compared with 32,504 in 1913. At the close of the year 1914 the division had made and sold over 150,000 cars in all civilized countries.

## Reports Data on Gasoline-Electric Car

### S. A. E. Metropolitan Section Traces Progress

NEW YORK, Feb. 22—The meeting of the metropolitan section of the Society of Automobile Engineers last night marked the close of its fiscal year. Besides the business coincident with the closing of the year, the subject of discussion was the report of the gasoline-electric research committee, which was appointed early in the summer of 1914 to investigate and report on the status of this art.

Robert McAllister Lloyd, consulting engineer, was elected chairman for the ensuing year, succeeding Joseph A. Anglada, who held that office for the last 3 years. J. Edward Schipper was elected secretary and Professor W. C. Marshall, treasurer. Under a new form of constitution adopted prior to the election, the governing committee is increased from three to five members, ex-President Anglada and Niran Bates Pope, the retiring secretary, being elected as governors to serve for 1 year.

The financial reports of the section showed a balance on hand of \$192.99 and a membership of 140. The secretary's report giving a review of the year dwelt particularly on the work of the research committees, of which six were appointed but only in one instance, that of the gasoline-electric, had any real valuable results been obtained. It was pointed out, however, that this should not discourage the work, as with new methods of attack this can be made one of the most valuable branches of the society's work, as the results will not only be available for the section members, but also for the society at large through the transactions.

The report of the gasoline-electric division, which consists of David Beecroft, chairman; W. P. Kennedy and L. G. Nilson, was in the nature of a preliminary report. It was divided into three divisions, read respectively by the different members of the committee. The first dealt with the nature of the work and the method of carrying out the investigation; the second dealt with the methods of classification and the description of the different systems which fell under these classes,

and the third went into the history of the development of the gasoline-electric drive and the patent situation.

Mr. Beecroft, who spoke of the methods used in carrying out the work, pointed to the difficulties in the way of busy men in bringing the results to a satisfactory close. He stated that the gathering of the data was more readily accomplished by the committee than the large amount of clerical work involved in its tabulation. He also pointed out the desirability of having the society as a whole support financially the work of these committees. Mr. Kennedy pointed out the method of classification, which is primarily two-fold.

The first classification includes those vehicles in which the energy of the motor is completely transformed into electrical energy. The second classification included those drives in which a portion of the energy only is converted into electrical and the remainder is delivered mechanically. The committee was somewhat puzzled over the reception that would be given to the including of magnetically-transferred drive into the second class, as it was feared that many of the members would not agree with the members of the committee in terming a magnetic transmission, such as is used in the Entz, where the fields are positively connected to the motor shaft and the magnetic drag of these upon the armature is relied upon to transmit the power. The slip in this case is the only portion of the drive which is transferred into electrical energy.

Mr. Nilson, in his discussion of the patent situation, pointed that no fewer than thirty-six American patents relative to gasoline-electric systems of transmission have been considered by the committee in the course of its investigation. In addition many foreign patents have been gathered and descriptions of a number of systems which have never found their way into the patent office. The probable inception of the work was traced back by Mr. Nilson to W. A. Patton, in 1889, according to the committee.



# Syracuse Section to Absorb Many Cars This Year

Anticipated Volume of Prospective Business Estimated at \$5,000,000

SYRACUSE, N. Y., Feb. 27—So successful in point of attendance and business was the show of the Syracuse Automobile Dealers' Association which closed tonight that the 1916 exhibition will run for 6 days. This year it was but 5 days. The first show 7 years ago ran 3 days and in succeeding years the run was lengthened to 4 and 5 days.

Syracuse is the biggest territorial show in New York state, not counting, of course, the big New York show which is a national event. This city distributes over a wide area north and south and the attendance included dealers and prospective buyers from many large and small towns from the southern state line to Ogdensburg at the far north.

This season should see \$5,000,000 worth of motor cars and allied products distributed in the section fed by this city, and in the sale of cars alone a compilation of statistics indicates a 75 per cent increase in business as compared with the 1914 season. In many instances dealers state that their sales to date equal or nearly equal the 1914 business, which is cited as evidence that their prediction as to 1915 is founded upon fact rather than mere prospects and hope.

The territory should buy 3,500 cars this year, as compared with less than 2,000 last year, not counting used cars. About 40 per cent are bought by residents of farming communities.

## Much Interest in Used Cars

One of the features of this year's show was the used car exhibit. Twenty-six nicely appearing used vehicles were housed by themselves in the basement of the state armory, where there were excellent lighting and clean and show-like surroundings.

In previous years the prospective buyer who was interested in used cars could see them only by making a trip through the cold to the dealer's salesroom, and then the car was often seen in surroundings which dampened the buyer's enthusiasm. The used car savored of junkiness, seen as it often was in the dim light of a garage. The used car section of the exhibit made things better and more pleasant for the buyer and the dealer; the man who was interested in used cars—and many of them were—had but to descend a flight of stairs to view a good assortment.

And this used car display was as carefully inspected as the new car display on the upper floor. Each car carried a placard telling the name and year of the car and, in many cases, the price. There were several real bargains picked up by buyers.

In one other way the dealers made the show pleasant for the visitors. The Armory contains two halls, one for the infantry service and the other for the cavalry.

Heretofore it was necessary to make a circuitous trip to get from one hall to the other, but this year the dealers cut a door through a brick wall at a cost of \$2,000 and threw the whole show into practically one unit.

There were two bands, one in each hall, with a button and buzzer connection between them. When one band finished a selection the other band was signaled to start, and in this way there was always music with no discord. The man who was halfway between the halls could hear either band, but with the buzzer arrangement he never heard but one at a time. Soloists worked with the music.

The exhibit housed sixty exhibitors, who displayed a total of ninety new cars and chassis, eighteen trucks and twenty-six used cars, a total of 134. Of this total but seven were inclosed cars. Some of the dealers planned to include inclosed cars but did not receive them in time. Anyway, the inclosed car trade in this city has not progressed as rapidly as in some other cities. The Syracuse car owner seems content with a touring car, and most owners drive their own cars.

There are 3,000 cars running in this city and about 40 per cent of them run all winter. Curtains serve to keep out most of the wintry blasts and that suffices. The mean temperature during the winter seldom gets far below the freezing point and the streets are at all times fairly passable. In the territory to the north, south, east and west cars are kept running wherever

the roads are in any fit condition. One owner is reported to have driven recently from his home to town over the crusted tops of snow drifts without difficulty. In the territory east of Oswego along Lake Ontario one dealer stated that there generally are not more than 60 days that cars cannot be kept in service. The general report is that in the country districts cars are driven if there is a semblance of broken road.

## Syracuse Serves Rich Territory

The Syracuse territory—which embraces as a general rule ten counties but sometimes several more—possesses a large buying power. The cities are industrial, the manufactures are many and varied and the lines of agriculture are also of great variety. This variety and prevalence of small industries tends to preserve an evenness of conditions which does not obtain in those cities where industrial health is dependent upon one or two large factories.

In the cities of this section, which are Syracuse, Binghamton, Auburn, Rome, Oswego, Watertown, Fulton, Cortland, Ogdensburg, Ithaca and also Utica and Binghamton in some cases, there are 2,000 factories with an annual output of better than \$150,000,000. There are in ten counties 7,000,000 acres divided into 50,000 farms, averaging 133 acres to the farm. The total value of the farms and farm property is \$300,000,000, and this does not include farmers' resources aside from the land, buildings and equipment. Crops and bankrolls are not counted.

# Outlook in and Around New Haven

Show Points Out Season's Prospects

NEW HAVEN, Conn., Feb. 27—In that part of New England which centers around the city of New Haven, motor car dealers sold last year cars to the value of \$2,796,000, and for the current year, conservative estimates place the total volume of sales at approximately \$4,116,000. Although these amounts may seem small by comparison with the totals that are piled up by such great distributing centers as Kansas City, Omaha and Minneapolis, where the dealers have hundreds of thousands of square miles of territory from which to draw, it must be remembered that the territory which is covered by New Haven dealers is almost microscopic by comparison.

The average New Haven dealer calls as his territory an area which does not exceed 1,500 square miles. In this territory there is a possibility that he may sell 1,037,000 persons. This is made up of

New Haven, Fairfield and Middlesex counties, the respective population figures being 337,000, 45,637 and 245,352. But not every dealer has these three counties in which to sell cars. Only the larger dealers can place their agents in these counties adjoining New Haven. The smaller agents must be content with New Haven county, including the city of New Haven with a population of 144,500, and perhaps a small part of Fairfield and Middlesex counties. In some few instances, the larger dealers have the whole of the state of Connecticut for territory.

Most dealers concentrate their selling efforts on New Haven itself, few of them having more than three or four sub-dealers in other cities in their territory.

As a selling center for the state of Connecticut, the city of Hartford is pointed to by New Haven dealers as being the most important. It is stated that

though the population of Hartford is but 107,000, as against 144,500 for New Haven, the number of cars sold in the former city in a year is considerably greater than in the latter. And the reason for the seeming delinquency of New Haven is laid down to the fact that it has but three sides, whereas Hartford has four. Furthermore, it is pointed out that Hartford is one of the richest cities, per capita, in the United States.

As is the case in so many other cities throughout the country, the used car problem looms rather large to the New Haven dealers, though the proximity of New York has relieved matters somewhat by providing an outlet. Lately, however, the atmosphere has been considerably clarified by the action of the New Haven Automobile Trades Association, which has subscribed for the used car central market report of the Chicago Automobile Trade Association for its members. This has operated to stabilize used car values and the report is quite generally referred to when a used car is offered in trade or for sale. It is the consensus of opinion, however, that the "as is" values, as given in the report, are slightly too high for New Haven, and for this reason the practice of subtracting about \$50 from the value given in the book is gaining. This permits the dealer who takes in the used car a margin upon which to work in order to cover overhead and such minor repairs and adjustments that may be necessary on the car.

Although the demand for electric cars is small in this particular territory, it is steadily increasing and bids fair soon to reach proportions which will not bear overlooking. There are at present approximately seventy-five electric passenger and commercial vehicles in the city of New Haven and the two dealers in electrics are optimistic for the future because of the absence of hills in the city, the comparative cheapness of current and the excellent roads in the surrounding territory. Road improvement has made it possible for the electric tourist to make such trips as to Meriden, Bridgeport or Waterbury quite easily, and this, it is pointed out, will have a stimulating effect. During the year gone by, the Detroit agency distributed about sixty cars, and this it is expected will be increased to seventy-five for the present year.

#### BIG SAXON SHIPMENTS

Detroit, Mich., Feb. 26—The biggest production and shipping day in the history of the Saxon Motor Co. was February 22, when 115 were turned over to the railroads. All departments are working full time and although the old Abbott plant where the Saxon company now is located is fully one-third larger than the former Saxon home, it is by no means adequate to take care of the increasing business. Further expansion will probably be necessary soon.

## Now Comes New England's Big Show

### Boston Ready to Stage Big Exhibit

BOSTON, Mass., March 1—Manager Chester I. Campbell, of the Boston Automobile Dealers' Association, took charge of Mechanic's building today with an army of 350 workmen to transform the structure into a Grecian bower for the annual motor show. He has changed his plans this year so that the show is to be opened at 2 next Saturday afternoon instead of at 8 Saturday night, as in former years. This will do away with the great crush that marked the opening of the show each year, it is expected.

This year it will be a combination passenger car and truck exhibition, the dealers having voted some time ago to discontinue the separate truck show of past years. In order to get the trucks in it was necessary to shorten up a little on some of the spaces upstairs so that more exhibitors could get in. As a result there will be a larger display of vehicles than in the past. There will be some makes new to Boston for several agencies have been closed the past few months, and as soon as this was done application was made for space. The late comers were willing to take anything that they could get. Some of them will be forced to show in the basement with the trucks, but the greater number will be in the two big halls upstairs.

The decorations this year will be along the lines of Grecian scenes. Last year they were Venetian. In Grand hall a temple 25 feet high surmounted by a gilded dome will rise up at the intersections of the main aisles. The ceiling will be studded with lights, and streamers of electrics will run in all directions across the hall. Fifty golden spheres with colored lamps will hang at different heights over the floor. The rear wall back of the stage will be covered by a mural painting showing the Acropolis, which will be one of the largest decorative effects ever seen in this country. It will be 40 feet high and 150 feet across. Blending into it will be a curve of marble columns draped by vases and statues, forming a background for the musicians. In this hall will be an orchestra composed of members of the famous Boston Symphony orchestra.

In Grand hall the larger number of makes that have occupied the stage and main aisles will be seen again such as the Pierce-Arrow, Packard, Cadillac, Peerless, Winton, White, Stearns, Locomobile. The Stevens-Duryea space will be occupied by the Maxwell and the Marmon line will have the Knox space. In the balcony above there will be a lot of accessories, as usual.

In Exhibition hall, the triangular section, the place will be transformed into a Grecian grove. There will be a series of large white columns, and at different sections there will be many trees whose

branches will form arches across the aisles. Thousands of Greek oleander blossoms will be used, so that the trees will not overshadow everything. And there will be a lot of real birds in the branches chirping out a welcome. Azaleas in full bloom and green hedges and budded plants will add to the soft artistic effect. The lights will blend harmoniously with the rest, making an effective setting and carrying the garden effect to its highest point. There will be glass signs on white marble decorated pillars. The marble effect will be used in the balcony also. The crude finish of the basement will be entirely eliminated by an elaborate treatment of mural paintings and decorated pillars. Beautiful vases and flowers will cover the stairways.

In this hall there will be a great number of exhibitors, for there is more room. They will comprise about all the well known makes on the market. This year there will be an absence of the cyclecars which were so numerous a year ago. The management states that there will be more than 400 vehicles and chassis on exhibition, and the total exhibitors will be more than ever. Despite the ban on accessories by the accessory association there will be all the well-known devices displayed through the medium of the local dealers.

#### HOOSIERS HAVE NEW IDEA

Indianapolis, Ind., March 1—To stimulate motoring and to develop at the same time a broader and more intimate knowledge of the past of the state of Indiana, a series of Sunday tours have been planned by the Hoosier Motor Club of this city. These week-end migrations will be known as "History Hunts Through Hoosierdom" and originated with W. S. Gilbreath, secretary of the club, and John Guy Monihan, chairman of the runs and tours committee.

The terminus of each run will be one of the many historic spots in which Indiana abounds. The first tour is scheduled for April 18 when the motorists will drive to Lafayette and visit the Tippecanoe battlefield, the scene of a battle between Tecumseh's braves and the forces of General William Henry Harrison in 1811.

Other battle fields famous in Indiana's frontier history will be visited during the summer. The motorists also will drive to Lincoln City, the burial place of Nancy Hanks Lincoln, mother of the great emancipator; to Vincennes, the original site of the government; and to Fountain City, where stands the old brick homestead which sheltered Eliza after she fled across the ice-choked Ohio river with her child to escape the slave master, and the former residence of Rev. Levi Coffin, president of the imaginary underground railroad of the slavery days.



# Southwest's Big Crops Spell Motoring Prosperity

## Conditions Among Farmers Analyzed by an Expert

**T**HIS is the first of a series of monthly industrial reviews on the great southwestern territory embracing such states as Missouri, Kansas, Nebraska, Oklahoma. At present these four states comprise a great part of the grain-producing section of the Mississippi valley, which is one of the great granaries of the world. In these war days with higher grain prices, the valley of this section as a motor-buying factor is more important than ever before. The writer is one of the best-known authorities in this territory, a man who has watched the growth of these states during the last 25 years and who is daily in close contact with the pulse of the leading financial and industrial movements taking place in this zone. The farmers in the four states, Missouri, Kansas, Nebraska and Oklahoma still have in their granaries \$94,401,880 worth of grain, which at the present price is capable of purchasing 94,000 motor cars, each with a retail value of \$1,000.

**KANSAS CITY, Mo., March 1**—There are four great economic matters that will have a bearing on the ability of the big grain and stock states of the southwest to continue and increase their purchase of motor factory products this summer and fall as they have in the past. These are:

1—The price the winter wheat crop still on hand continues to bring.

2—The acreage and condition of the winter wheat crop—now in the ground—that will be harvested the middle of this summer.

3—The size of the coming corn crop.

4—The livestock situation as affected by the quarantines that have resulted from the outbreak of the foot and mouth disease.

### Big Four Prospects

After a careful investigation among western bankers, grain associations and livestock men, it is apparent that Kansas, Missouri, Oklahoma, Nebraska—the big four of the southwest—not only will continue to buy motor cars, but should continue to show an increase in buying. The other grain and stock states of the Mississippi and Missouri valley will show the same general conditions, with certain variations as, for example, in northern states where spring wheat is the heavy crop instead of winter wheat.

The southwest has bought motor cars and still is buying motor cars on the winter wheat that was harvested last summer. Still, in Kansas, Nebraska, Missouri and Oklahoma, it is estimated by grain men that there remains nearly 20 per cent of that crop. Some of it is going to market gradually, some of it will be held until the new crop is close by. But the farmer himself right now is getting for all he is selling between \$1.40 and \$1.50, depending on the location of his property.

### Still Holding Grain

What he may get if he holds on to the fifth of the crop he still has in his bins, of course, depends on war conditions. Indications are this week that he is holding pretty well, too. The exporters are sending grain that is in second hands and the farmers are sending less of their crop to market than they were at this time a year ago. Then, figuring \$1.40 a bushel—to be conservative—we have in the farmers' bins in Kansas, Nebraska, Oklahoma and Missouri

this much wheat, which is estimated to be worth as follows:

	Still in farmers' bins, bushels	Value
Kansas .....	36,260,000	\$50,764,000
Nebraska .....	13,623,200	18,072,480
Oklahoma .....	9,595,000	13,433,000
Missouri .....	8,666,000	12,132,400
	68,144,200	\$94,401,880

The farmers apparently are so comfortable that they are in no hurry to sell this wheat. A large part of this is surplus, and surplus spells motor cars everywhere. Enough wheat is left over to buy 94,000 \$1,000 cars in these states alone!

The winter wheat now in the ground: With the exception of Kansas, which shows only 2 per cent less acreage than for the great wheat crop now selling, the states mentioned show a greater acreage. The report, with the exception of Nebraska, was not so good compared with the year before, but since that time the condition in both Kansas and Oklahoma has greatly improved. The war is still on. Kitchener says it will last 3 years. These great wheat states are prepared. Here is a table on the winter wheat crop now—in the ground—in the southwestern states:

	WINTER WHEAT				Condition December 1		
	Area sown		Autumn 1914		10-yr. average		
	Autumn 1913	Compared with 1913	Total preliminary	1914	1913	1914	1913
	Acreage	%	Acreage	%	%	%	%
Missouri .....	2,585,000	110	2,844,000	87	98	90	90
Nebraska .....	3,444,000	105	3,637,000	90	86	93	93
Kansas .....	8,958,000	98	8,779,000	80	100	90	90
Oklahoma .....	2,577,000	120	3,092,000	83	103	87	87

—From the Farmer's Bulletin, 645, United States Department of Agriculture.

Corn is a great crop in these four great southwest states. The corn crop means fall buyers. The preliminary condition is first class. The corn belt has had moisture and lots of it this spring and the indications are that the ground will be in prime shape for planting, a matter of no small consequence when the farmer is figuring the chances for his crop making good.

The animal industry is a trifle less pleasant to view at this time. Cattle only are affected by the quarantines established by the government and states because of the foot and mouth disease. At this time only Kansas and Missouri are open to stocker and feeder—breeding cows and cattle to be fed—shipments. There is a tendency, however, on the part of large stockmen and bankers han-

dling cattle paper to view the slowing up of cattle shipments to market with equanimity. W. T. Kemper, president of the Commerce Trust Co., of Kansas City, which handles much cattle paper, says regarding this:

### The Livestock Outlook

"The drouth in Kansas, Nebraska, Oklahoma and Missouri, 2 years ago, took thousands of head of cattle out of these states as well as out of New Mexico and Texas. It shortened the breeding stock on the farms and ranches. The stock cattle that the southwest does not ship to market this winter will be ready for market in the fall and where there then was a cow, in the fall there will be a cow and also a calf. The quarantine won't hurt, it will help to restock the southwest and it's a creation of a new wealth in a very few months."

Adding to the interest of the man who makes motor cars is a look into the general wealth of the farm producers in the big grain and stock raising states. For example, take the value of all farm produce in the United States. Without the 3,828 million dollars for animal products, the total compiled from the 1914

figures of the department of agriculture is 6,044 million dollars. In five states of the southwest this year the value of thirteen field crops, corn, wheat, oats, barley, rye, buckwheat, flaxseed, rice, potatoes, sweet potatoes, hay, tobacco and lint cotton is \$1,113,036,000. This means of course that most of it is in wheat and corn, excepting Texas, where cotton counts, although cotton prices this year put Texas lower than the 5-year average. Here are the five states:

	1914	Five years' average
Kansas .....	\$287,662,000	\$164,844,000
Texas .....	288,335,000	336,725,000
Nebraska .....	210,099,000	153,869,000
Missouri .....	192,981,000	188,689,000
Oklahoma .....	134,159,000	117,618,000

And this does not include the crops of Minnesota and the Dakotas. Of course there is duplication to a certain extent



in the department figures caused by the fact that it is hard to say what part of the value of animals is made up of hay and grain-fed. However, it is sufficiently close to cause amazement at the comparison that may be made between the total of these five states and the entire country on farm products.

The banks as a barometer of business conditions in the southwest make a good showing. Money is easy and abundant in the banks of Kansas City as well as all of its trade territory. December 31, the date of the last call on the national banks, the Kansas City banks showed deposits of 110 million, which was  $9\frac{1}{2}$  millions in excess of the same time last year. It is estimated that since that call the deposits in Kansas City national banks have increased to 118 millions. The bank clearing show an increase of from 25 to 45 per cent as compared with the same time last year.

The next week or so probably will see tremendous strides taken in the jitney business and tremendous efforts as well to put the jitney out of business. In this city there has been a steady increase in the number of cars operating. Last Saturday, always a big transportation day, the jitneys in Kansas City handled 40,000 to 50,000 passengers. This meant from \$2,000 to \$2,400 was cut off of the Metropolitan Street Railway receipts that day. Other days of the last week probably saw a reduction in street car fares of \$1,000 to \$1,500.

E. K. Carnes, traffic manager of the jitney station, estimated that 225 cars were engaged on the Saturday trips and that of this number about fifteen were buses, seating from eight to twelve passengers. The jitney carried the straphangers down in the morning and on account of the large number of Saturday shoppers coming down in the early afternoon and going home before the rush hours, kept busy carrying both ways all day.

#### The Jitney Outlook

It is still too early to figure the outgrowth from this jitney business, whether it will be transformed into a bus seating from eight to ten persons, or whether the small five-passenger cars will continue to do a large part of the business. Jitney buses seem to have a clear profit when they report fares averaging \$16 a day. However, the \$8 average of the small touring cars, in the estimation of local dealers will pay good wages to the owner of a small car and take care of his expenses and depreciation.

The big question that is affecting the jitneys is the preparation of ordinances in western cities to regulate them. The street railway influences are strong and not stronger elsewhere than here. Telegrams from coast cities and Texas cities where the jitneys are thriving say that to date no ordinances have been adopted, but that the jitney drivers and their patrons are watching every move of the

street railway interests to put them out of business by the demands for liability bonds and heavy license fees.

In Kansas City the street railway has appealed to friends in the city government which recently granted a 30-year street railway franchise. The ordinance will be taken up in council committee and the first week in March probably will see some sort of regulation. The city counselor's office, it is feared by the jitneys, will force a \$10,000 liability bond for each car and a \$10 license fee with a \$5 occupation tax.

#### Serious for Street Railways

Of this the bond is the most serious as the jitney livery business will be put as a high risk by the insurance companies, if obtainable at all. This in view of the fact, too, that the street railway company, has not paid a damage claim in 5 years as a result of its receivership. It has been unable to finance its new franchise on account of the war and the indications are that the jitneys will keep it in a receivership for a while longer. Just how serious a view the street car companies are taking of the jitneys may be had from this abstract from the United States Investor:

"Meeting with the popular approval as this jitney business has, if a movement is made to suppress them, some form of popular referendum will be invoked. The

sentiment of the west does not furnish a very cheerful outlook for the street railway companies. The street railway companies are face to face with one of the greatest problems they ever have been called upon to face."

The United States Investor is friendly to the street car companies. It warns them of what to expect and is it not to be expected that the street car companies will turn every stone to put this new motor industry out of business?

With the close of the motor show, it is possible to make comparisons with the show last year. The paid attendance showed an increase this year of 39 per cent over last year and 75 per cent over the 1913 show. The total number of attendants was 40,000. The show committee has always kept the amount of money actually taken in a secret, but it is understood that the paid admissions amounted this year to \$21,000.

As all of the proceeds of the show go to finance the show of the succeeding year, 1916 will see a demand for space that Convention hall with its 50,000 square feet will not be able to take care of. The directors of the dealer's association are planning the installation of a second balcony. This year the first balcony and the corridors that entirely surround the arena floor, were crowded and more space could have been used advantageously.

## Uncle Sam Strong in South America

### Consuls Tell of Recent Trade Progress

WASHINGTON, D. C., Feb. 27—That the United States has in the last few years been making steady advances in the markets of the various South American countries is plainly brought out in a publication just issued by the bureau of foreign and domestic commerce, of the department of commerce, entitled, "Consular Recommendations on South American Trade." This trade extension has been in general the result of a generally awakening interest in the southern continent on the part of American manufacturers, an interest due partly to the opening of the Panama canal and partly to the general increased attention to foreign trade. The European war has of course still further stimulated this awakening interest, and has made more valuable than ever the various recommendations made by consular officers who have been studying the markets for years.

Consular recommendations are well summarized in a report from Rosario, Argentina, which states that the principal factors in extending American trade may be included under five heads: Investment of American capital, steamship facilities, credits, direct personal effort, and willingness on the part of American manufacturers to comply with local requirements. The first two of these points have been thor-

oughly discussed in the press and in official publications, and steps have been and are being taken to provide the missing facilities. The matter of credits is constantly emphasized, and an illustration is given of how the usual American practice of insisting on cash with order or cash against shipping documents works a hardship to South American importers of merchandise.

That Latin-Americans insist on having just the kind of article that suits their taste is illustrated by an incident in Guatemala. An old gentleman in the interior, a large ranch owner, always had been used to a certain kind of necktie, and asked a local house to buy a number of them for him. The house ordered several from an American concern, but the latter wrote back that that kind of necktie had been out of date for 20 years, and sent several of the latest design. These were refused, however, the old kind was obtained from Europe, and the American house lost what might have been an opening wedge to a good trade.

The publication referred to, miscellaneous series No. 20, is of twenty-nine pages and is being distributed at 5 cents a copy by the superintendent of documents, government printing office, Washington. Perhaps the motor industry may be interested.

# Chicago Institutes a Short-Haul Jitney Service

## News of the Busmen in Other Big Cities

**C**HICAGO, March 2—Chicago's first jitney bus made its appearance on the streets Wednesday and on Friday the number had been increased to four. Three of these are touring cars and one is a limousine. The service was installed on Madison street, a street car line being in operation on the same thoroughfare. The jitneys run between Halsted street and the loop district, and were installed by James Levy, president of the Chalmers Motor Co. of Illinois, and Nathan Jacobs, of the Newberry Auto Livery Co. A local newspaper also was behind the movement. The reason for the installation of this service was to break the ice for private jitney men and thus offer a solution for the second-hand car problem, a particularly puzzling one in Chicago.

Limited as the service is in its beginning, it seemed to meet the approval of the public which patronized it to capacity. It is expected that this service with small cars will be extended by private interests. Meanwhile, movements are under way by five different concerns toward the establishment of regular bus lines of from eighteen to thirty-passenger cars to operate on the streets and boulevards of the city.

Impetus has been given to this by the decision of the corporation counsel's office, that no franchises are needed. This decision has led to some feeling on account of the fact that the installation of a bus service has been held up for some time by the delay of the city council in granting franchises. Just about the time one concern succeeded in securing a franchise, after considerable trouble the legal department threw the field open by the announcement that no franchise was needed.

The situation is somewhat complicated at the moment by doubt as to whether the boulevards are open to the buses, as these are under the control of the park boards, which are independent of, and do not always agree with the city authorities. It seems to be the consensus of opinion at the moment that the boulevards are closed to buses without special permit.

For operation on the city streets, the usual state license and city wheel tax are necessary, as for any motor car. In addition, the driver must be a licensed chauffeur, and finally, must pay a special fee to the city, with which goes a cab-stand permit. This fee depends upon the carrying capacity of the car. Cars seating fewer than three passengers, \$2.50; from three to eight, \$5; more than eight and less than twenty-five, \$10; and more than twenty-five passengers, \$25.

There are today twelve jitney buses running on the streets, most of the service being confined to Madison street and Blue Island avenue. Instead of all-day service, the operation in the main is confined to

the rush hours, the buses running between the hours of 6 and 8 in the morning, during the noon hour and from 5 until 7 in the evening. Even with this limited period, the twelve buses are averaging \$7.40 in receipts per day. This is hardly sufficient to make the operation of the buses profitable, but with more extended periods of operation, it is expected that profits will be shown.

### JITNEY RULING IN WASHINGTON

Washington, D. C., Feb. 28—Decision to allow jitney buses to operate under either of two sections of the license law has been made by the district commissioners after a conference with the promoters of the proposed bus service. One of the sections provides for a \$6 annual fee and the other for a fee of \$9. The former charge is made for vehicles carrying passengers for hire "over a route sufficiently definite to enable the public to ascertain the streets and avenues on which vehicles can be found en route. The latter fee is for licenses as public hacks. Licenses for operation over definite routes require the approval of the district commissioners.

Several conferences which may result in the incorporation of the Washington Jitney Bus Association were held this week with Andrew I. Hickey, president, in charge. If the association abandons its present identity and becomes a corporation, it will be because its backers fear that as soon as the lines are fairly established under certain provisions of the hack law, the city government, seeing the utility of the jitney lines, will attempt to class them as common carriers and bring them under the direction of the public utilities commission, prescribe schedules and otherwise regulate the operation of the buses.

"It has been indicated to us that this is the intention of the city authorities," said President Hickey, "and for that reason we have determined to postpone the establishment of the lines until we can find out exactly where we stand. The backers of the association do not relish occupying one position today, under the hacking law, and a different position 2 or 3 months from now as would be the case if the commissioners sought to bring us under public utility control."

### JITNEYS IN OHIO CITIES

Columbus, O., Feb. 27—The jitney bus is not taking as rapidly in Columbus, as has been the case in other cities of the country. The number of buses which are being operated by individuals remains about the same as formerly, lack of patronage has not compelled the owners to consolidate into a concern for the purpose of operating buses on the regular schedules.

One of the reasons given for the partial failure of the idea in the Buckeye capital is the fact that the local street car service is thoroughly well organized. Outside of a few outlying sections the street car service is good and there are only a few complaints heard. As a result the jitney bus appears to be out of place in Columbus.

In Cleveland, the idea is taking root rapidly and organized service on many of the streets is being given. Preparations have been completed for the operation of buses by the Cleveland street car system to compete with the jitneyites.

In Dayton, the jitney buses also are quite popular and they are having an effect on the earnings of the local street car system. The announcement was made that the traction officials would operate buses in competition with the jitneys.

In Toledo they are also quite popular and the number is gradually increasing. Service has been organized on many of the principal streets of the city and the people are riding on the buses as a protest against the methods of the traction monopoly.

In Cincinnati quite a few jitney buses have been operated with a measure of success. Service is moved from the center of the city to outlying districts where the street car service was notoriously bad.

### JITNEYS IN DENVER COURTS

Denver, Colo., Feb. 24—A mandamus suit to compel Commissioner of Finance Clair J. Pitcher to issue 137 permits for motor cars to be used in jitney bus service was filed today in the district court by the Denver Street-Auto Service Corp. The above number of applications filed by this one concern have thus far been refused by Commissioner Pitcher, whose office makes him ex-officio excise commissioner. The city council recently passed a bill declaring a jitney bus line a public utility and requiring any persons or corporations wishing to operate such a service to apply for a regular franchise. But the jitney bus promoters claim they have a right to permit the same as have persons operating taxicab service.

Eighteen five-passenger Ford cars, which the above corporation had purchased and prepared for the service thus far prohibited, were turned over to the Auto Clearing House Co. 2 days ago, and have all been sold.

### JITNEYS INCREASING IN DES MOINES

Des Moines, Ia., March 1—The jitney bus industry is just 4 weeks old in Des Moines and forty-three jitneys already have been licensed to operate. They are expected to multiply with great rapidity when spring opens. According to the most



complete statistics available, the jitneys now in service are picking up the cream of the transportation business and getting 10 per cent of the city railway company's gross receipts. The average gross income of each jitney is about \$12 a day and some run as high as \$15 a day with a minimum of \$10 a day. Cutting the estimates down to the minimum, the jitneys now in service would get \$430 a day, indicating an annual income of about \$150,000 a year with the number of jitneys now in service. The annual gross income of the city railway is about \$1,300,000.

The Des Moines jitney catches its big crowds at morning, noon and night when the street cars really make the money. It cut in on the short haul which is an important factor in the street car business. It also takes advantage of the street cars in several ways. The street cars sweep the tracks free from snow and the jitney then drives in ahead on the cleared tracks and picks up the street car's prospective passengers.

Whether the jitney is a paying proposition in Des Moines still is to be determined. It is claimed by many that the driver makes a good wage, pays expenses, and

no more with the result that in a short time his car is worn out. However, many of the Des Moines jitneys are old cars already headed for the junk pile.

#### BANKRUPTS PAYING DIVIDENDS

Detroit, Mich., Feb. 26—The creditors of four bankrupt motor car manufacturing concerns are receiving or will shortly receive dividends from the Detroit Trust Co., receiver for the concerns. The creditors of the Lozier Motor Co., are to receive a first dividend of 5 per cent which will total about \$160,000; the first dividend to the creditors of the American Voiturette Co. will be 10 per cent and total about \$50,000. A fourth dividend of 5 per cent has been ordered paid to creditors of the Flanders Mfg. Co., making the total to date 50 per cent or about \$500,000. Application was also made to the court to pay a final dividend to the creditors of the Warren Motor Car Co., making a total of 20 per cent or about \$80,000.

#### STREET RAILWAY HIT HARD

Dallas, Tex., Feb. 27—During the month of February, according to estimates handed out today the street railway company at

Dallas lost at least \$30,000 from the operation of jitney cars in Dallas. There now are 412 licensed jitneys in the city and the number is increasing daily. Monday morning a public hearing on a proposed ordinance by the city of Dallas was had before the commissioners of the city. This ordinance will compel all jitney drivers to file a \$10,000 bond with the city assessor and collector of taxes.

As a result of this jitney service the sale of motor cars in the city of Dallas last week broke all former records, 136 licenses for numbers being issued. The former record was eight-one cars in a week. The drivers of jitney cars have organized the Dallas Jitney Association and indications are that this service has come for good.

#### MASTER DISTRIBUTES DIVIDEND

Los Angeles, Cal., Feb. 24—The Master Carbureter Corp. has distributed a 25 per cent cash dividend to its stockholders. The concern which was incorporated in 1913 has a capital stock of \$150,000, and has been making 800 to 900 carbureters a month. The business outlook is reported to be very satisfactory.

## John N. Willys Tells of Jitney Progress in England

### Street Railway Interests May Block American Movement Temporarily

LOS ANGELES, Cal., Feb. 25—"The tremendous political influences exerted by the electric street railway interests may succeed for a short period in retarding the sudden and great development of the jitney bus, but it never will be able to suppress that new and popular means of transportation," declares John N. Willys, president of the Willys-Overland Co., at his winter home in Pasadena. Since arriving in California, Mr. Willys has made a study of the jitney bus in the cities where its remarkable rise to popularity started.

"The public in this country is just awakening to the possibilities and advantages of motor transportation," continued Mr. Willys. "In London, the electric lines, known over there as trams, are owned and operated by the London county council. This body is extremely jealous of its abilities and has branched out into numerous paternalistic schemes. As soon as the motor bus became a factor in transportation, 9 or 10 years ago, the council began exerting every effort within its great power to suppress motor buses in the interest of the huge investments in which that body had involved the taxpayers in the construction of electric street railways.

"The public, however, rallied to the defense of the newer and more popular means of transportation and today, notwithstanding the fact that the council's pet street railways are facing certain bankruptcy as a result of motor competi-

tion, the people stand by the motor buses and refuse to see them unjustly dealt with.

"In England the jitney business is no longer confined to the cities. There have been dozens of bus services established between smaller towns. Out of London lines run in all directions carrying passengers into the country to points which never have before been available to the rank and file.

"It is true that a great protest has gone up from the exclusive element which heretofore has practically monopolized these rural districts, but the authorities have been true to the motto, 'The greatest good for the greatest number.'

"At the beginning of the war a tremendous movement was on foot to nationalize motor bus transportation and compete more and more with steam railways, which in their suburban passenger traffic already are being hard hit by bus competition. In historic old Oxford the trams have entirely disappeared from the streets.

"In London," said he, "it has been demonstrated that the motor bus can, without attaining dangerous speeds, so completely outstrip the electric street car in the transportation of passengers as to make the latter unattractive to the public. The street car gets tied up every time a driver of any other sort of a vehicle gets on the track. These delays make car schedules extremely slow and uncertain.

"On the other hand, despite the fact that the bus itself weighs from 7,000 to

8,000 pounds it accelerates quickly, runs around obstacles and delivers and picks up its passengers next to the curb.

"But the foreigners never have enjoyed the advantages which America has at its door in the form of possibilities of a small car, or jitney bus transportation, for the reason that prices at which motor cars sell over there, and the cost of upkeep, put the small car out of competition. About the cheapest small car fitted for jitney work abroad would cost the operator \$1,750. Gasoline costs fully double in London what it does in this country in a wholesale way, because in addition to the cost of transportation from the distant countries in which it is produced, there is a tax of 6 cents per gallon upon gasoline used in pleasure cars, and 3 cents per gallon for that used in taxicabs, omnibuses and for commercial purposes.

"But the important point which promises cheap and satisfactory transportation to the American public is the wonderful strides which have been made in this country in the construction of good, serviceable automobiles at only about half the price at which they can be produced abroad. This means more to the jitney business than might at first be supposed, when one thinks only of first cost or the original investment carried as a fixed charge."

Mr. Willys is of the opinion that manufacturers of moderate-priced cars will soon be turning their attention to the production of a special type.



# Points Out Possible Dangers of Jitney Bus Competition

## Views of President of Fifth Avenue Coach Co. of New York

NEW YORK, March 1—That the municipal authorities in many American cities are making a serious blunder in permitting unrestricted competition of the jitney bus with established transportation facilities was the statement made today by R. W. Meade, president of the Fifth Avenue Coach Co. The occasion of Mr. Meade's remarks was the publication in the newspapers of telegraphic dispatches to the effect that trolley line extensions in several western cities had been stopped as the direct result of jitney bus competition. President Meade made the following statement:

"The danger in the situation is that the busmen, the municipalities and all others apparently are plunging ahead without giving much thought to consequences. The municipalities will sooner or later wake up to the fact that they have destroyed a useful, dependable and responsible public utility and have in its place nothing on which the city or the public can rely.

"If transportation facilities in any city are not sufficient or proper, a satisfactory remedy cannot be obtained by putting irresponsible agencies in competition with them. Whatever may be said in criticism of the failure of street railway systems in some of our cities to provide adequate facilities for the transportation of the public, they at least can be held accountable, both to the public and to the municipalities. This cannot be said of the jitney bus unless the imprisonment of the owner can be considered a satisfactory remedy, because most of these men have nothing in the way of property except their bus, and that frequently is owned subject to a chattel mortgage. The owner snaps his fingers at damage suits, and being financially irresponsible, he cannot be brought to book.

"But the great danger in the situation lies deeper. Some one is going to wake up and that is the jitney busmen, because of the fundamental fact, which my own company has learned by long and expensive experience, that the motor bus costs more to operate in America than the trolley car. There isn't any doubt of this: The Fifth Avenue Coach Co. is no infant as far as passenger-carrying companies go. As far back as nearly 30 years ago it was operating horse-drawn stages on Fifth avenue; later it tried out, to its chagrin, the storage-battery type of bus, and about 8 years ago it adopted the gasoline-driven type of vehicle. Now, in this history of over a quarter of a century, the company before it became self-supporting, lost something like \$1,000,000, but it learned a great many actual first-hand facts about bus operation.

"The Fifth avenue company today is moderately successful, but it charges a 10

cent fare, runs over a limited and favorable stretch of territory, has a plant and equipment of such a character that its operating costs are reduced to the minimum obtainable in this country and in the present state of the art, and is managed with scrupulous care by an operating staff that has been many years in development. In spite of these advantages, the company spends 9 cents out of each dime of its service in providing for operating expenses, maintenance, and depreciation, reserves for damage claims, taxes, percentage of gross earnings paid to the city, interest on capital, etc.

"If the company were able to keep back for its own uses the \$60,000 it pays each year to city and state; if it were able to sent out its buses when the harvest is good and take them in when pickings are poor, and escape regulation by the authorities and any responsibility for damage claims; if it were able to forget the morrow and cut down its reserves for maintenance, depreciation, etc., in a word, if it were able to operate anywhere and everywhere without regard to schedule or other restrictions, the company could no doubt make a highly favorable financial showing for a few seasons. What might happen after that is another matter.

"The situation among the jitney bus men is that they have all this to learn. Of course, there will be a reckoning some time in the future, but in the meanwhile sad havoc is being played in the traction situation in some localities, and the investments of those who have depended upon the good faith of municipalities to protect them are being destroyed and the public is going to be the sufferer in the end."

### CAR COMPANY CO-OPERATING

Portland, Ore., Feb. 27—What is believed by General Manager Hild, of the Portland Railway Light and Power Co. to be the first traffic agreement so far entered into between a trolley system and a jitney bus company has just been made, the contract having been signed by the street car company and the Auto Bus Co. for the interchange of business in the east side district.

By virtue of the contract, the jitney and the street cars will interchange passengers upon a transfer basis. The jitney buses will serve a considerable residence district now without street car service, and frequent bus service will be maintained to offer rapid transit to the street car line. The contract runs for 2 years.

### WOMAN DRIVING A JITNEY

St. Louis, Mo., Feb. 27—From the bridge table to the wheel of a jitney bus

is the leap made by Mrs. Nellie M. Read of St. Louis during the past week. Several days ago while engaged in a game of bridge with members of her set, Mrs. Read announced she would like to engage in the new bus project. One of the party dared her to enter her car in the service of the Motors Service Co. and drive it herself. So this week she appeared with the Motors Service fleet and was stationed on the Olive street division, where her car did a land office business.

Mrs. Read does not intend to abandon her new venture and will continue in the service. She expects to purchase a new car this spring if she is successful, will add several more before the season is over and engage in competition with the present bus lines.

### MUST PAINT GAS CANS RED

Milwaukee, Wis., March 1—A warning has been sent to every garage and dealer in petroleum products by the state oil inspector of Wisconsin that the law requiring containers for gasoline, benzine, naphtha and other volatile oils, to be painted vermilion red must be strictly observed. It is also pointed out that anyone using a vermilion red can or kerosene may be prosecuted for violating the law.

The state oil inspector explains that the warning is sent at this time because of too much laxity in respect to the color of containers in the past. The growth of the number of garages has augmented the problem.

### WHOLESALE ARRESTS IN ST. LOUIS

St. Louis, Mo., March 1—As the result of the crusade of the local police against motor car owners who did not have 1915 license plates on their cars last week, after 2 weeks' warning, 500 motorists were arrested and of this number 265 were released on bond, the others convincing the police authorities they had applied for the new plates. When the men appeared in court most of them were fined from \$10 to \$25 and instructed to get licenses at once. The arrests, most of them, were made at three of the city's busiest corners, three or four policemen laying in wait for the plateless machines. In some instances one patrolman escorted six cars to the station house.

### SEEK AID OF FARMERS

Detroit, Mich., Feb. 27—At the annual convention of the National Brick Manufacturers' Association, several of the speakers urged that a movement should be started throughout the country for a system of government or federal roads. It was suggested that the farmers espe-

cially should voice their sentiment by calling meetings and passing resolutions which should be sent to the representatives in Washington. If the farmers earnestly start a good roads movement to be looked after or taken care of by the government, then the matter will be taken in consideration more seriously, because it is generally conceded that in matters of good roads the farmers' voice or sentiment is a deciding factor.

#### ARIZONA MAY REVISE LAW

Phoenix, Ariz., Feb. 26—Secretary of State Sidney P. Osborn, in his annual report, takes issue with the Arizona tax commissioners, who made the assertion in their report that the registration fees for motor vehicles in this state are too low.

In arriving at their conclusion the commissioners took the California law as a basis. There the registration fee for machines under 25 horsepower is \$10, and in Arizona it is \$5. Osborn draws attention to the fact that California has issued \$18,000,000 worth of bonds for a state highway system and states that the Golden state motorists receive far more for their money than do those of Arizona.

"The depreciation of a car in this state, because of the wear and tear occasioned by the miserable roads, is conservatively estimated to be 50 percent greater than in California; but under the present circumstances to raise the license fee practically

would amount to extortion and would be unwise in the extreme," he says.

Osborn urges that the S. A. E. rating be abandoned and some more equitable system adopted for determining the horsepower of a car. Another recommendation is that the upper half of the glass in all headlights be frosted.

At present the secretary is required to issue a chauffeur's license to anyone who can pay \$5. He recommends that this license be abolished or that applicants be compelled to pass a practical and technical examination. He asks the legislature to grant him authority to revoke a chauffeur's license for cause.

#### OHIO SHOWS ROAD PROGRESS

Columbus, O., March 1—James R. Marker, Ohio highway commissioner, predicts that within 10 years every important thoroughfare in the state will be in a good state of repair and maintenance, if the progress made during the past year is continued.

Commissioner Marker reports that during the fiscal year ending November 15, 1914, contracts providing for the building of 550 miles at a cost of approximately \$7,000,000 were awarded. In addition there were 140 miles of road completed during the year and a total of 307 miles was repaired. The department also assumed the future cost of maintenance of 600 miles.

essary for the driver to do anything other than to stop his truck as quickly as possible. It might be done, for instance, by simple automatic action on the part of the fender, by which its front edge would be practically instantaneously lowered to the street without any danger of pinning the person underneath. Yes, and we will go further and say that it is also possible that a fender could not only drop its front edge to the street automatically and quickly enough to save a person, but could also at the same time prevent injury from the initial impact by some peculiar fadeaway movement, involving the same principle as that of drawing your hand away to take off the sting when catching a baseball barehanded.

Another argument against the use of fenders on trucks has been that only one wheel is protected when turning corners. While this, we will admit, tends to detract from the efficiency of fenders as life-savers, it is of only slight importance, for very few accidents, it must be considered, would be likely to happen when turning corners because of the necessary slow driving and extra vigilance by the driver at such times, and then when an accident does occur, one wheel and most of the machine is protected, which is certainly far better than no protection at all. Would it be wise policy, we may ask, to condemn the use of fenders because they were not absolutely perfect life-savers under all circumstances?

Finally, there have been put forth the usual and apparent disadvantages of projection; the disadvantages of having anything at all to project in front of the machine. This is the only real objection that can be placed against the use of a really efficient life-saving fender on trucks, but we believe that it is not, and should not be, sufficient reason to condemn the use of a device that would really save lives. And the proper kind of a fender would not be such a great objection in this respect as might first be thought. In the first place, the fender need not project perhaps more than 18 or 20 inches ahead of the truck, and that is certainly not unreasonable. Secondly, the fender might be folded up from the driver's seat easily and quickly at any time; this would be important in stopping, going into the garage, for storage, on country roads, and at many other times. Thirdly, it is conceivable that the fender could be made strong enough not only to stand reasonable wear and tear, but also to be capable of taking a little jolt now and then against the curb or a wagon without any danger of putting it out of commission or necessitating its immediate removal. Finally, all disadvantages of projection that can be laid at the door of a really sane, practical and efficient life-saving fender sink into insignificance before the great benefit to public safety and humanity that would result from the general use of such a device.—Fonger Fender Co.



#### Answers Objections to Truck Fenders

CHICAGO—Editor Motor Age—A great many arguments have been put forth of late against the practicability of using life-saving fenders on trucks. These arguments have come practically entirely from makers and users of trucks, and it is our purpose as fender manufacturers to attempt in this brief article to answer some of these arguments, to defend the use of fenders on motor trucks and in a measure, therefore, to justify our existence as makers of such equipment.

In the first place, it has been argued that fenders on trucks are unnecessary. What sane person, we may ask, realizing the many chances of accidents on the streets of a large city by all sorts of vehicles, can sincerely maintain that all such vehicles, or any one kind or type, do not need to carry life-saving devices, such as fenders, etc.? The need for the better protection of the public, as shown by the coroner's figures year after year, make it highly necessary for trucks, as well as other vehicles that are likely to injure or kill pedestrians, to carry some sort of efficient and practical life-saving fender that would tend to materially reduce the annual toll of lives if such a

device can be found. The argument that such a fender cannot possibly be found and that it is foolish to look for it is nothing more or less than old-fashioned and narrow-minded. Certain wise ones some years ago said that man could not fly. How close they came to the truth we all know.

In the second place, it has been pointed out that fenders on trucks are not practical, because in order to be safe they must be run too close to the street for ordinary road conditions, and if run high enough for road clearance, would have to be dropped in advance by the driver in most cases to save the person about to be struck. There is a great deal of truth in this argument, and many fenders now on the market have justified it. But, will anyone be so narrow-minded as to state that there is no fender in existence now, or that it would be impossible to make one, that would not be open to this serious objection? It is perfectly conceivable to us as fender manufacturers that a fender can be carried high enough for road clearance and at the same time be capable of picking a person up, even in prostrate position, without its being nec-



# Guayule a Factor in the Rubber World

## How Mexicans Are Developing the Shrub

By W. D. Hornaday

THE highlands of Mexico and Texas are capable of affording practically unlimited quantities of a wild shrub from which is obtained by a simple and cheap process crude rubber that is said to be very little below the famous Para product in grade. It is the lowly guayule shrub that promises to revolutionize the rubber industry, not only of the United States but of other countries of the world. Practically all ink and pencil erasers and jar rings are now made of pure guayule rubber. It enters largely into the manufacture of motor car tires, insulated wires and cables, and is combined with tree rubber in the manufacture of belting, matting, hose and a great variety of rubber goods.

### Product Improved

It is claimed by men who are prominently identified with the guayule rubber industry that if the proper attention is given to its manufacture a product can be obtained which is fully the equal in grade to the best Para rubber. In the early stages of the manufacture of crude rubber the trade became somewhat prejudiced against the product because of its inferiority, that was due entirely, it is said, to the lack of experience in handling not only the raw material but the crude rubber.

In those days the practice of stacking the bales of cut shrubs in the sun and allowing them to remain in the open with the hot rays beating down upon them for perhaps weeks at a stretch, generally was followed by manufacturers. It has been found that the rubber content of the shrub is greatly injured by heat and the plan of putting the raw material through the rubber-extracting process as quickly after it comes from the field as possible is now being followed with splendid results. Vacuum dryers and deresinating plants also have been installed in the

different factories and by this means all the moisture and resin are taken out of the product before it is exported. Guayule rubber requires about 3 per cent more sulphur than harder rubber to aid in the vulcanization.

Within 4 years after the practicability of extracting crude rubber from the guayule shrub was established the annual production of this product had mounted up to more than 10,000 tons, which approximately was 20 per cent of the world's annual yield of crude rubber from all sources.

This was the condition of the industry 4 years ago, at the time of the outbreak of the revolutionary troubles in Mexico. Since then there have been long periods when the cutting of the guayule shrub upon the ranches and the extracting of its rubber content were interrupted, but it is expected that there will be a revival of the industry on a larger scale than ever when peace in the country is reestablished.

Large portions of the states of Zacatecas, Durango, Coahuila and Nuevo Leon, in Mexico, and the upper border region of Texas are splendidly adapted for the growing of the guayule shrub in its wild state, and it is claimed that it can be produced by planting and cultivation methods in a considerable area of country where it is not indigenous. How many million acres are more or less covered with the valuable



AS THE GUAYULE SHRUB LOOKS AFTER BEING CUT

shrub could only be determined by an actual survey, and a research of this character never has been made.

When the fact became generally known that the shrub was valuable for producing rubber, lands that formerly were practically worthless came into great demand. It was not uncommon for ranch lands in northern Mexico to be sold for as low as 30 cents per acre, but with the discovery of the rubber properties of the guayule shrub these lands advanced enormously in price.

### Peculiarities of Guayule

One of the peculiarities of guayule is that it grows only upon the poorest land. The shrub long had been looked upon as a pest by the ranchmen. It was probably the most despised species of vegetation in the arid region. Goats and sheep had a habit of chewing the limbs and leaves of the shrub and in this manner the rubber ingredient was extracted and formed into big balls in the stomachs of the animals, often causing their death. Mexican children received their supply of rubber balls from this source.

While the ranchmen of the region where the guayule shrub grew in its wild state were well aware that it contained rubber, the thought did not occur to any of them that it might be made a profitable source



MEXICANS PACKING GUAYULE SHRUBS TO HAUL FROM FIELD



of revenue. The credit for the discovery of the commercial value of the shrub belongs to Dr. Adolfo Marx, of Saltillo, Mexico, who began his experiments with the plant about 14 years ago. In 1903 he erected at Saltillo the first factory for extracting crude rubber from guayule.

It was not until 3 years later, however, that the rubber trade in the United States and Europe gave the new product recognition. From that time on the industry grew by leaps and bounds, and but for the interruption caused by the protracted warfare in Mexico it would perhaps today head the list of revenue producing products of that country. Shortly after Dr. Marx began the manufacture of crude rubber E. Delafond, a French chemist, took out a number of patents covering the process of extracting the product from the shrub. These patents as well as a number of others which were filed with the Mexican government from time to time were declared void and the process now is at the free disposal of any one who wants to use it.

#### Making It Into Rubber

The factories use the mechanical method. It consists merely of cutting the shrub, including the roots where the whole plant is pulled up, into small pieces by means of machinery, and placing them into a vat where they are converted into a pulp and the rubber is separated from the other substances and is precipitated to the bottom of the receptacle.

Soon after the value of the desert vegetation became known large American financial interests invaded the field, both in Mexico and Texas. What is known as the Aldredge-Rockefeller syndicate, which began operations in Mexico under the name of the Continental Rubber Co., with subsidiaries to handle the different branches of the business, invested upwards of \$30,000,000 in the purchase of guayule lands, the erection of factories and the establishment of a marketing system of the crude rubber that is produced.

One of the guayule ranches of this syndicate is situated in the state of Zacatecas and embraces 2,000,000 acres of land. Exhaustive experiments have been made upon that ranch in the growing of guayule under the direction of noted American botanists. It is claimed that the reproduction of the shrub from the seed can be accomplished and that the new growth attains a commercial size within 3 years, whereas, it formerly was believed that the shrub was of such slow growth that it took 6 to 8 years to reach the marketing stage. It is usually 3 to 4 feet high when cut.

The guayule land holding of Salvador Madero and other members of the Madero family are next in size to that of the Aldredge-Rockefeller syndicate. The Maderos were operating guayule rubber factories on the Hacienda San Tiburcio, state of Zacatecas and at Parras, San Pedro, Cuatro Cienegas, and Torreon, all

in the state of Coahuila, at the outbreak of the revolution. Some of these factories are running still. It is estimated that the guayule shrub upon the Madero lands aggregates about 200,000 tons and that the quantity upon the Aldredge-Rockefeller lands is about 300,000 tons. There are a number of smaller guayule producers who own considerable areas of land upon which the shrub grows.

For the first 2 or 3 years, following the beginning of the industry on a commercial scale, the demand for the guayule shrub caused an enormous flow of money into the laps of the land owners who heretofore had regarded their holding as being of little value. In many instances the rough, grassless land gave a yield of as much as 2 tons of the shrub per acre. As high as \$180 Mexican money, which

a considerable area of the Texas side of the Rio Grande and extending towards the interior or the state for perhaps 100 miles in the region around Marathon and Alpine has been cut and utilized in the rubber factory that was built at Marathon a few years ago.

It is stated, however, that systematic methods of reseeded the land with the shrub and making the industry permanent are now being carried out in several localities and that it is thought the lands of that region will again be brought into a state of production within the next few years. There still is considerable quantities of the shrub in the more remote sections along that part of the border.

It is predicted by men who are prominently connected with the industry that



UNLOADING GUAYULE SHRUBS AT FACTORY

was equivalent to \$90 gold, was paid per ton for the shrub. This gave the land owner a revenue of \$180 gold per acre for a wild product that always had been regarded as worse than worthless.

During the last few years the larger manufacturers of crude rubber have taken steps to conserve the supply of guayule shrubs by adopting the method of cutting only the larger and maturer plants; also by propagating new growth by seeding. The 4 years of partial inactivity of the industry, due to the disturbed conditions of the country, has caused the new growth of shrubs to attain commercial size and it is said that there is now as much of the raw material available as there was when cutting was first commenced about 10 years ago.

#### Not Affected by Cold

The freezing temperature that often is felt in the high plateau and mountainous regions of Mexico and the upper border territory of Texas where the guayule shrub is indigenous does not injure the vegetation. It thrives where the rainfall is slight and upon the shallow soil that covers the limestone streaks. Much of the original growth of guayule that covered

the time is not far distant when enormous plantations of guayule shrubs will be set out and that they will be sources of large revenue for their owners. With the development of the motor industry and the many increased uses for rubber there is no reason why the growing of guayule should not be made a profitable business, it is claimed. The plants are slow of growth, to be sure, but no more so than the rubber tree. Within 4 or 5 years, at the most, a guayule plantation should begin bringing in an annual revenue of not less than \$100 per acre, even figuring on a very low price for the raw material. By replanting the production could be kept up indefinitely. No cultivation or other attention is required during the growing period.

In localities where the shrubs that originally grew close to the factory have been exhausted the gangs of men who do the cutting and baling live nomadic lives, moving camp from place to place. The patient burro is used usually to carry the shrubs to the baler. When compressed into bundles the raw product is hauled in wagons to the factory. In some cases the haul is 20 miles over rough roads.

# Routes and Touring Information

**MOTOR AGE** this week resumes its *Routes and Touring Information* department, which was discontinued during the winter months. Inquiries as to routes and road conditions will be answered to the best of *Motor Age's* ability, free of charge. The only stipulation made is that the inquirer must give his or her correct name and address as evidence of sincerity and not necessarily for publication. Nom de plumes or initials may be used when the inquiry is published, but no attention will be paid to communications unless name and address accompany them.

## Motor Service Planned for Pacific Coast Tourists

**T**HE west will see the California expositions from touring cars. Up and down the Pacific coast motor cars will race with railroad trains headed for the Golden Gate and San Diego. An all-gasoline route will parallel the trunk line railroads traversing the coast from Seattle to San Francisco, and on south, if the plans of prominent motor enthusiasts in the northwest do not fail.

In the west, 5-cent buses are displacing the street cars. Now the touring car is to be tested against transcontinental trains and swift sea-going ships. Prairie-schooner days are about to be revived, but these modern ships of the plains will not show white under the light of the sun, nor will they lumber laboriously along behind the ox or the mule. A black, rain-proof top will take the place of the snow-white tarpaulin that covered the pioneer's creaking wagon, and six and eight-cylinder gasoline engines will pull the rubber-shod, luxuriously-equipped machines swiftly and silently over rural roads the like of which prairie schooner motive power rarely, if ever, put hoofs upon.

### The All-Gasoline Route

The object of the all-gas route is not, of course, to make traffic war on the railroads. It is more strictly to furnish a new and novel means of covering a continent to travelers who have tired of steel rails, snorting locomotives and stuffy coaches. Parties of five, seven, or more persons may charter their own special, and start and stop along the way as often as they like. Every fellow must be his own porter en route, thereby saving tips to help pay the added cost of riding on rubber instead of on iron-bound wheels.

There will be special hotel accommodations along the route. Meals may be had from the company operating the line, or they may be taken with farmers, at the option of the transcontinental joy-riding tourists. Arrangements likewise will be made for bathing, and the traveler who cannot forego his regular hot tub or shower may have this whim satisfied by paying for it.

Garages will be erected or rented along the right of way. These will be used as service stations, where cars may be repaired, tanks replenished with fuel and oil, or for furnishing relief cars. At all

the scenic points sanitary, convenient camping stations will be built. Thus, the patrons of the line may stop off, enjoy a few days in camp, living in the open, and resume the journey at almost any time without consulting the "conductor" about lay-overs and time-tables.

### Good Meals Promised

There will be a commissary department that will equal, if it does not excel, the best offered by dining cars and cafes. A tourist may have a T-bone or a fry of oysters, or sardines and crackers, or toast and deviled ham—anything fancy dictates. Laundry and cleaning service will be provided, but how this is to be managed the superintendent has not disclosed.

There will be a baggage and express service, but no trunk-smashers will be tolerated. There will be health and sanitary departments, the latter to look after the camps.

Big, high-grade and high-powered touring cars will be used in this transcontinental gas-train service. There will be porters, guides, camp managers, starters and roadmen—more employees than the "biggest show on earth" can boast. The porters will not ride on the cars, and the guides will operate from the camps reeling off scenic stories at a phonographic pace. Roadmen, corresponding to the section hands of the steel roads, will see that there are no broken rails in the form of bad ruts or washed away bridges to short-circuit the timetables. There will be no block-signals, however, and, therefore, outside of towns no limit to the speed.

### All Kinds of Conveniences

At the control stations there will be telegraph, messenger and mail service. Tickets for the trip will be sold just as they are in union stations. The price has



**T**HE Chicago, Kansas City and Gulf highway is claimed to be an important connecting link between Chicago and Los Angeles via Kansas City. The distance along this trail arc as follows, starting from Chicago: Geneva, 36.3 miles; De Kalb, 60.7; Sterling, 117.6; East Moline, 165.7; Moline, Ill., 170.2; Davenport, Ia., 173.8; Iowa City, 231; Washington, 263.5; Ottumwa, 320.7; Centerville, 362.8; Chillicothe, 470.8; Cowgill, 504.9; Excelsior Springs, 535.6; Liberty, 551; Kansas City, 567.4. Davenport is the first night stop west of Chicago. Iowa City has just opened a fine new fireproof hotel, while the Automobile Club of Southern California is figuring on continuing its large steel signposts east from Kansas City over this route. Robert N. Carson of Iowa City, Ia., is president of the Iowa division of this trail.



not yet been set, and whether the interstate commerce commission can assume authority over this new all-gasoline road depends upon the nature of present laws and the ability of law-makers to get together and make regulations for the line's government before it has covered the fairs via the rural roads.

Hundreds, perhaps thousands, of private car owners in the west have long been planning to visit the expositions in their machines. Many of them, having never been out of hailing distance of a garage, are timid about venturing out on the long, lonesome road. For these the establishment of the new company means much. Such drivers, for a consideration, may make the trip over the public highways and use the company's stations and

other conveniences along the motor route.

The company is to be made up mostly of second-hand, or used-car, dealers. These men will put their combined stocks on the road, and the machines operating up and down the coast will probably total many hundreds.

While the fares probably will exceed those charged by the railroads, the toll will be well spent from many standpoints. A much better idea of the western states may be had by riding through them in motor cars, and numerous stops can be made. There will be an opportunity for hunting and fishing and sightseeing unforded in any other way. "See the scenery from a motor seat," probably will be the slogan of the gasoline route from Seattle to San Diego.

## Answers to Many Inquiries for Routes

### To Lake Michigan Points

**SHAWNEE, Okla.**—Editor Motor Age—We are planning a trip via Kansas City to Chicago and Milwaukee, and desire information on the route from Kansas City to Milwaukee. What are the road conditions in July and August? Also, we desire to go up the lake some distance from Milwaukee and return via Denver.—Mrs. J. D. Lydick.

From Kansas City you should route to Des Moines, Ia., via St. Joseph, Mo., over the Inter-State trail, 259 miles, through Edgerton, St. Joseph, King City, Albany Eagleville, Osceola, Indianola, Des Moines. Or a good option from St. Joseph is through Rochester, Stanberry, Grant City, Mt. Ayr, Afton, Winterset, Des Moines, 193 miles.

From Des Moines there are three routes from which to choose, all merging into the Lincoln highway before reaching Chicago, as will be seen on the map of transcontinental routes in the February 25 issue of Motor Age. In this number you also will find complete information as to the road conditions during the touring season, all of which are good throughout the summer months.

As to the route from Chicago to Milwaukee: We suggest that you watch these columns, or write the Routes and Touring Information department, early in the summer for this information which at that time will be more up-to-date and accurate, as much road work is being done in that vicinity. In all probability it will be completed before the touring season is well along.

From Milwaukee it is possible to tour north along the shore of Lake Michigan to Sturgeon Bay, Green Bay and up into the northern peninsula to Escanaba and Marquette. As you do not seem to be very definite as to your destination, we would suggest that you secure a copy of the 1915 Blue Book, volume 4, which covers this section very completely.

For the return portion of the trip, you can retrace your route to Des Moines, and follow the Lincoln highway to Cheyenne, Wyo., then come down through Greeley to Denver, as shown on the map in the February 25 issue, returning to Kansas City from Denver by way of the Pike's Peak trail and the Red Line route through Colorado Springs, Colby, Beloit, Manhattan and Topeka. Blue Book, volume 5 covers the section west of the Mississippi river.

### O'Neill, Neb.-Chicago

Phoenix, Neb.—Editor Motor Age—Kindly give me the best route from O'Neill, Neb.

to Chicago, by way of Bloomington, Wis.—Roy Wilson.

Leaving O'Neill drive east through Orchard, Royal, Plainview, Pierce to Norfolk, then continue east to Sioux City, making local inquiry at Norfolk as to directions and road conditions.

From Sioux City you will have a direct route east as far as Dubuque, Ia., 344 miles, routing first to Fort Dodge, Ia., 146 miles through Merrill, Marcus, Cherokee, Storm Lake, Fonda, Fort Dodge; to Waterloo, Ia., 107 miles through Webster City, Iowa Falls, Aplington, Cedar Falls, Waterloo; to Dubuque, 91 miles, via Independence, Manchester, Centralia, Dubuque. Leaving Dubuque drive north on the west side of the Mississippi river 168 miles through Farley, Petersburg, Girard, crossing the Mississippi at McGregor into Prairie du Chien. Continue eastward to Mt. Hope, thence to Bloomington, Wis., making local inquiry at Mt. Hope, or Prairie du Chien, as to directions to Bloomington.

Returning to Mt. Hope and with Chicago your next destination, go east to Madison, Wis., via Mt. Ida, Preston, Montford, Edmund, Dodgeville, Ridgeway, Blue Mounds, Pine Bluff; thence to destination, 152 miles, through Stoughton, Janesville, Fairfield Harvard, Ridgefield, Crystal Lake, Algonquin, Maywood. Complete running directions will be found in volume 5 of the Blue Book.

A good alternate route from Norfolk to Prairie du Chien, though possibly a little longer, would be to go north from Norfolk on the Meridian road for 122 miles through Pierce and Yankton to Bridgewater, turning east at this point and riding 39 miles to Sioux Falls, S. D. From Sioux Falls go to Prairie du Chien, via, Spencer and Mason City, over the North Iowa Pike, the distance being 342 miles. The towns en route are: Sioux Falls, Canton, Rock Valley, Sheldon, Spencer, Whittemore, Britt, Clear Lake, Mason City, Charles City, West Union, Luana, McGregor, crossing the Mississippi into Prairie du Chien.

### Jacksonville, Fla.-Asheville, N. C.

Daytona, Fla.—Editor Motor Age—Kindly give me two routes from Jacksonville, Fla., to Asheville, N. C., and the mileage.—George H. Foot, Jr.

From Jacksonville go north to Savannah, 177 miles, through Callahan, Kings Ferry, Ownes Ferry, Tarboro, Old Sterling, Brunswick, Darlen, Riceboro, Freedman's Grove, Savannah. Proceeding to Augusta, Ga., 132 miles, route via Monticello, Rincon, Ardmore, Sylvania, New Sardis, Waynesboro, Augusta. Two hundred and forty-eight miles you will

have to cover to reach Asheville, the intermediate points being Batesburg, Lexington, Columbia, S. C., Spring Hill, Newberry, Laurens, Mauldin, Greenville, Hendersonville, Asheville.

An alternate route would be to drive to Atlanta, 388 miles, going first to Valdosta via McClenney, Olustee, Lake City, Houston, Live Oak, Ellaville, Lee; thence to Macon, through Adel, Tifton, Sycamore, Worth, Vienna; and Atlanta by way of Forsyth, Orchard Hill, Hampton, Jonesboro and Hopeville. A stretch of 188 miles will bring you into Greenville, S. C., through Scottsdale, Stone Mountain, Auburn, Jefferson, Commerce, Royston, Lavonia, Anderson, Piedmont, Greenville; to Asheville, 60 miles is through Hendersonville and Biltmore.

Volume 3 of the Blue Book covers these two routes with complete running directions. **Guthrie Center, Ia.-Rogers, Ark.**

Guthrie Center, Ia.—Editor Motor Age—I would like to know the best route, or where route books may be procured, covering a route from Guthrie Center, Ia. to Rogers, Benton county, Arkansas.—G. W. Merrill, Jr.

As you are only 50 miles from Des Moines, we recommend that you go there first routing via Panora, Panther and Dallas Center; or, with an option 5 miles longer through Monticello, Redfield, Adel, and Waukeke.

Leaving Des Moines with St. Joseph, Mo. your next objective point, you have two options; one via the Inter-State trail, 196 miles, through Indianola, Osceola, Davis City, Eagleville, Albany, King City, Union City, St. Joseph; the other, 3 miles shorter, taking you via Winterset, Afton, Mt. Ayr, Grant City, Landis, Rochester, St. Joseph. Both routes are kept in good condition.

Traversing the Inter-State trail from St. Joseph to Kansas City, which trail is marked with blue and white bands, you should drive through Halleck, Edgerton, Smithville, and Gashland.

Going south from Kansas City to Joplin, Mo., 181 miles, the route lies through the towns of Peculiar, Harrisonville, Lone Tree, Butler, Arthur, Nevada, Sheldon, Lamar, Jasper, Carthage, and Joplin. Leaving Joplin, the route goes through Neosho, Pineville, Sulphur Springs, Bentonville, Rogers.

Volume 5 of the Blue Book, published by the Blue Book Pub. Co., Chicago, covers this routing with complete running directions as far as Joplin.

### Colome, S. D.-Great Falls, Mont.

Colome, S. D.—Editor Motor Age—Kindly give me the best route from Colome, S. D. to Great Falls, Mont., and where I could secure a 1915 Blue Book.—G. E. Tackett.

From Colome, S. D., follow the highway west through Winner and across the Pine River Indian reservation to Hot Springs. From this point you have the choice of two routes to Cody, one via Deadwood and Gillette, and the other via Lusk, Douglas and Casper. We believe you will find the latter preferable. It is 483 miles to Cody routing through Edgemont, Hat Creek, Lusk, Mannville, Shawnee, Orin Junction, Douglas, Glenrock, Casper, Powder River, Armito, Lost Cabin, Holt Ranch, Thermopolis, Neiber, Worland, Basin, Burlington, Cody.

Leaving Cody drive north 106 miles to Laurel, Mont., passing through Warren, Bridger, and Fromberg. Here you meet the Northwest trail and follow same westward to Whitehall, Mont., 217 miles, passing through Park, Columbus, Reedpoint, Livingston, Bozeman, Belgrade, Logan, Three Forks, Whitehall. Head north at this point, riding through Boulder and Clancy to Helena, 93 miles; thence through Wolf Creek and Cascade to Great Falls.

Volume 5 of the Blue Book covers the entire routing, also gives optional routes from which a section can be made for the return portion.

# The Readers' Clearing House

## REGULATION IN REMY GENERATOR System Uses a Third Brush—Flux Is Distorted Between Brushes

CHICAGO—Editor Motor Age—Please explain the third brush regulation as used in the Remy lighting system.—H. M. McQuillan.

Regulation is obtained inherently by a third brush, which is connected to the field winding, as shown in Fig. 2. The amount of field current is controlled by distortion of the magnetic flux. At low speed the field flux is evenly distributed along the pole faces, as shown in the left illustration, but as generator speed increases, the flux flowing through the armature is distorted or bunched in such a manner, as shown in the right illustration, as to decrease the magnetic field or flux between the third brush and the main brush of opposite polarity, thereby reducing the field strength with attending decrease in current output.

## LAYING OUT AN EXHAUST CAM Simple Method of Planning One—Questions on Timing

Nowata, Okla.—Editor Motor Age—How would one ascertain the amount of dwell on a cam in degrees? Supposing you are working from the crankshaft or degrees on the flywheel? In other words, supposing you have the valve timing before you which you want to execute. How are you going to figure out your design of cam to operate valves opening and closing in proper relation to degrees of the already valve timing?

2—Is the relation between the crankshaft and camshaft equal, that is, when the crankshaft moves through the space of 10 degrees, will the camshaft move through 10 degrees or one-half of this? It seems as though it would be the same, and again it would move only one-half as fast, as the ratio is 2 to 1.

3—What would be the proper timing for a Ford motor for racing?

4—Of the two pistons, which one is the more efficient, and which one will stand the greater speed in feet per minute, magnalium or cast steel?

5—Which of the two pistons will weigh the most, both being the same size and made from the same pattern?

6—What clearance should be allowed with each piston for high speed work?

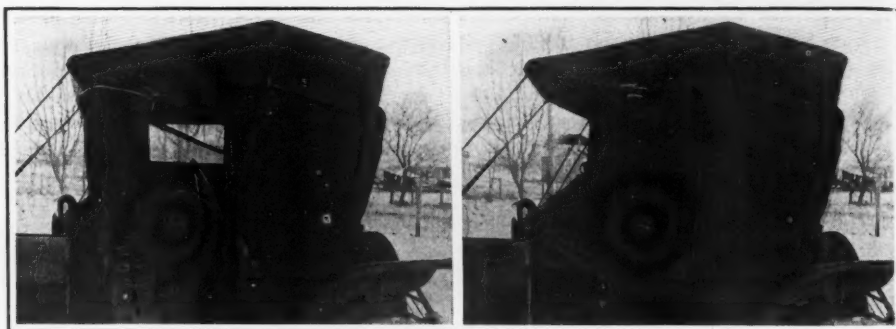


Fig. 1—The illustrations show how a Hupmobile owner fitted his roadster with a suitable covering for use in winter. The frame of the door is a piece of umbrella tubing stiffened at the bottom with a piece of 3-16 inch wire

7—Is there a patent covering the auxiliary exhaust valve applied to a gasoline motor, such as was used on the Franklin? If so, who has the patent right?—C. M. H.

1—Knowing the valve timing, a cam, to be used with a roller follower, is laid out in the following way: Let us assume that you are working on the exhaust valve which is to open 35 degrees before bottom center and close 5 degrees after top center, and that you have decided the valve lift to be  $\frac{3}{8}$  inch. This cam will keep the valve open 180 plus 35 plus 5 degrees, or 220 degrees of crank movement. One-half of this, or 110 degrees, is the equivalent camshaft movement. Referring to Fig. 4, lay out a circle with a diameter equal to four times the valve lift, or  $4 \times \frac{3}{8}$ , or  $1\frac{1}{2}$  inch. Make an allowance for clearance by drawing the clearance or outer circle about  $\frac{1}{16}$  inch larger than the base circle, which is the inner one. Then draw the radii AB and CB and produce them, as shown. On the lines, AB and CB, make centers V and W for circles equal to the cam rollers. Draw these circles tangent to the base circle. Next draw lines AY and

CX tangent to both circles, as shown. With B as a center and with a radius equal to the base circle radius, plus the valve lift or  $\frac{3}{4}$  plus  $\frac{3}{8}$ , or  $1\frac{1}{8}$  inch, draw the arc KL. By rounding off the corners, as shown, the cam design is complete.

2—When the crankshaft moves through an arc of 10 degrees the camshaft moves through one of 5, or half as much.

3—The proper timing would be that which gave the best results. The regular timing is: Inlet opens 12 degrees past top and closes 50 degrees past bottom; exhaust opens 37 degrees before bottom and closes on top center. You might get better results by using the following timing: Inlet opens 5 degrees after top and closes 50 degrees past bottom; exhaust opens 42 degrees before bottom and closes 5 degrees after top.

4—Both magnalium and steel give good results if properly designed. The former probably will stand more abuse than the steel.

5—The magnalium would weigh less than the steel.

6—With magnalium you can make the clearance .0005 to .00075 inch larger per inch of bore above that required for cast iron. With steel the clearance could be slightly more than for cast iron, but not necessarily as great as for magnalium.

7—Only the method of application, the design of the valve and method of operation appear to be patentable.

## SUGGESTS A GLASS-ROOF SEDAN Says Warmth of the Sun Will Be Appreciated in Winter—Other Features

Oklahoma City, Okla.—Editor Motor Age—I think the idea of having the roof in whole or in part of glass or mica should make the sedan car the ideal touring vehicle, especially with some arrangement to cover same with canvas or rubber cloth when desired to shade. The public seems to demand the comforts of the railroad Pullman coach and the only way to solve

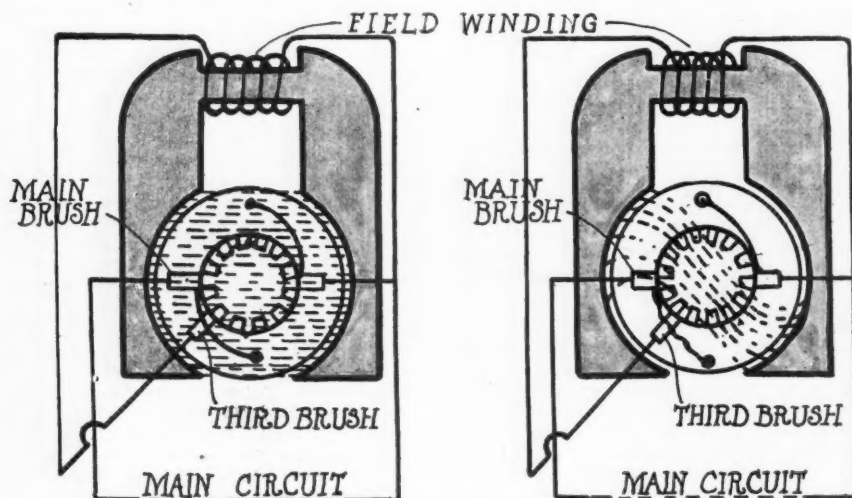


Fig. 2—This shows how regulation is obtained in the Remy generator by means of a third brush. The left illustration shows the flux at low speeds, and that at the right the flux at high speeds. Notice the flux distortion and the reduction of field strength between the third brush and the main brush



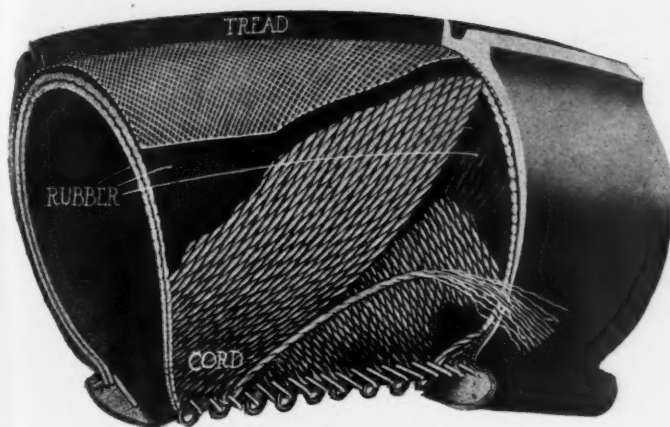


Fig. 3—Illustrating the construction of the Goodrich Silvertown cord tire. Notice the layers of rubber between the layers of rubber-impregnated cord

the problem seems to be by the entirely inclosed sedan with a glass roof, giving the comforts of the sunshine in winter days and, when desired, shade by means of a cover for summer, with the closeness of the Pullman to avoid all winds and dust.—B. R. Harrington.

### CANTILEVER SPRING ADVANTAGES

#### Reduce Unsprung Weight and Prevent Rebound—Friction Drive Features

Chicago—Editor Motor Age—What are the relative advantages and disadvantages of a fixed spark as compared with a variable spark?

2—What are the relative merits and demerits of the friction drive as compared with the ordinary gear drive?

3—What are the advantages and disadvantages of elliptic and cantilever springs?—Is there any advantage gained by having one or the other type on a light car, say a car weighing from 1,500 to 2,000 pounds?—Reader.

1—In the fixed spark ignition occurs at a definite point in the cycle and does not vary from that point at any time and it follows that under certain conditions the best possible results will not be obtained. For example, at high speeds the fixed spark may be a trifle too late. However, for small motors the fixed spark shows excellent results when everything is taken into consideration, such as the elimination of work on the driver's part in manipulating the lever and the poor results obtained from variable control when the driver is an unskilled one.

2—The chief advantages of the friction drive are that it is simple, less expensive than the ordinary gearset, it does not cost as much to keep in order and any number

of ratios are obtainable. The disadvantages of this type cannot be discussed, as they will depend largely upon the particular design.

3—The cantilever spring give easy riding, and reduce the unsprung weight to some extent. It is considered superior to the elliptic spring when rebound is taken into account. The mention of the type of a spring does not necessarily give one a clue as to its disadvantages, for these only can be determined correctly after a study has been made of some particular design.

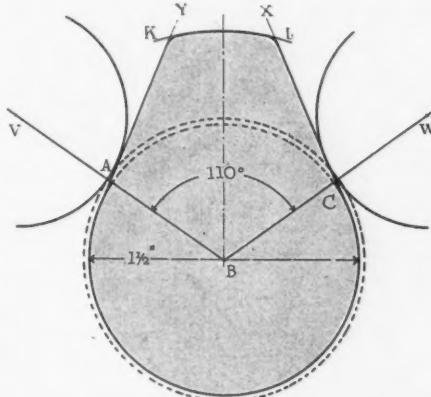


Fig. 4—Laying out of an exhaust cam to be used with a roller follower. The method of doing the work is given on the previous page.

For example, one design of elliptic spring may give better all-round results than a certain poorly-designed cantilever and similarly a certain type of cantilever may be far superior than a given design of elliptic.

### DESIRES TO FIT NEW SET OF PISTONS

#### Old Ones Are Worn and Cause Oil Leakage—Rings to Use

Harlington, Tex.—Editor Motor Age—I have a 1913 Cadillac, four-cylinder motor. It has been run 25,000 miles and has had good care.

Recently I have noticed that my car burns more gasoline and has less power. It also burns more oil but does not consume any more oil from the reservoir, as I have not altered the oil pump from the factory setting. I know it is properly adjusted. When the motor is running idle I hear piston slaps and the up and down ticking of piston rings. I am convinced that my cylinders, pistons and rings are worn and need replacing. I do not wish to replace the cylinders. I live too far out to send them to a city to have them rebored. I am going to try to overcome my trouble by fitting oversize pistons and rings, but first I would like Motor Age to advise me on the following points:

1—Could a fine grade of emery be used with oil to lap a piston into a cylinder, and if not,

what would answer and where could such a material be purchased?

2—I am under the impression that piston rings, where their ends meet and lap over each other would be better to use in an old cylinder than the regular ring that is used in the 1913 Cadillac.

3—Would the Cadillac company furnish me with oversize pistons and rings?

4—To quiet a valve slap, would it not be best to fit a new valve, valve guide and cut a new seat in the cylinder casting?—Wesley J. Bailey.

1—You can use a very fine grade of emery, or better still, ground glass. The latter is a better abrasive for this kind of work because there is less chance of cutting ridges in the metal. Either ground glass or lapping emery can be purchased of any supply house.

2—You probably refer to step-joint rings. These would not show very much better results than the ordinary type. Some of the specially-designed multi-part rings on the market should prove better for your motor.

3—If you will tell the Cadillac company the exact size of the pistons desired, they may be able to supply you.

4—It may not be necessary to do all you say, depending upon the cause of the slap. An improperly seating valve sometimes will slap as will one which is loose in its guide. Determine the cause and then find a remedy.

### ADJUSTING SCHEBLER CARBURETER

#### How Model L Is Tuned—Registrations of Motometer

Toledo, Ill.—Editor Motor Age—Kindly explain the adjustment of the model L Schebler carbureter.

2—If a Ford is equipped with a Boyce motometer, will it register "danger" if the water boils, as it often does on a hot day after a hard drive when there is nothing the matter with the motor?

3—Is it possible to let a radiator freeze at the bottom and yet the instrument not register it, as on a cold day a radiator will freeze at the bottom and yet feel quite warm to the hand at the top?—R. F. Stephens.

1—The Schebler model L carbureter is illustrated in Fig. 6. Adjust the auxiliary air valve A so that it seats lightly. Then close the needle valve by turning the screw B to the right as far as possible. Turn the screw slowly and as soon as it meets resistance do not attempt to move it farther. When the needle is seated fully turn it back five complete turns. Open the throttle about one-third and start the motor. Slowly close the throttle. If the motor is not running smoothly and slowly, adjust the needle valve by means of B and the throttle screw F, until it does. The idling adjustments now are complete. The dials D and E are the intermediate and high-speed adjustments. Adjust the pointer on the dial D about half way between 1 and 3. Advance the spark and open the throttle so that the roller on the track below the dials is in line with the dial D. If the motor backfires turn the indicator toward 3 a little more, or perhaps toward 1. Try both and see which gives the better result. With the throttle open wide or nearly so adjust the high-speed dial E the same way as D was adjusted.

If you have adjusted the dials properly evidently the trouble lies in improper

### Questions Answered and Communications Received

H. M. McQuillan.....	Chicago
C. M. H.....	Nowata, Okla.
B. R. Harrington.....	Oklahoma City, Okla.
R. E. Stevens.....	Woonsocket, S. D.
Reader.....	Chicago
Wesley J. Bailey.....	Harlington, Tex.
Burton Letson.....	Lonepine, Mont.
R. F. Stephens.....	Toledo, Ill.
Rolf Prom.....	Milton, N. D.
C. M. Stram.....	Crawfordsville, Ia.
E. G. Dinsdale.....	Double Bayou, Tex.
V. Vacek.....	So. Omaha, Neb.
C. A. Neal.....	Seattle, Wash.
Ukl.....	Williamstown, Mass.
A Subscriber.....	Round Lake, Minn.
H. C. Horn.....	Miami, Okla.
Clifford Falsbeck.....	Bloomington, Wis.
T. P. Willits.....	Salt Lake City, Utah
G. R. Bent.....	Oglesby, Ill.
H. E. B.....	Brooklyn, N. Y.

No communications not signed with the readers' full name and address will be answered.

spring adjustment. If the tension on the spring at A is not correct you will have trouble at low speeds usually. Take particular pains to have the valve just seat. See that the valve is clean and does not stick.

2—Yes.

3—If the water at the bottom is frozen and that at the top warm, the meter will register the temperature of the warm water.

### PROGRESSIVE GEARSET OPERATION

Simple Form Used on a Few 1915 Cars—

#### Cord Tire Construction

Lonepine, Mont.—Editor Motor Age—Kindly explain the construction of Goodrich Silvertown cord tires.

2—What is a progressive sliding gear transmission?

4—What time of the year do the motor car factories employ the most men?

5—On what principle does the M & S differential work?

6—Where can a map showing the route of the Lincoln Highway or the western half of it be obtained?—Burton Letson.

1—A section of a Goodrich Silvertown cord tire is shown in Fig. 3. This tire, instead of using a fabric carcass, uses one of rubber-covered cable cords in two layers. Between these layers of cord is a layer of rubber and over the outer layer of cord and under the inner one is another layer of rubber. Over the third layer of rubber is the breaker strip and then comes the tread.

2—One design of three-speed progressive gearset is shown in Fig. 5. In this type it is necessary to pass through second in order to get into high from first. It is a simple type of gearset using a countershaft with three gears, A, D and E. This countershaft is set freely into bearings at either end of the housing. The gear E always is in mesh with the gear H of the shifter shaft. Gear H is peculiarly constructed, having both internal and external teeth, as shown in the detail in the illustration. This gear is permanently fastened to the shifter shaft. What is called the first and second speed pinion is composed of the two gears B and C which are formed as a unit. Between these gears is a fork attached to the shifter rod, as shown, so that when the rod is moved by means of the gearshifter lever the pinion slides back and forth on the shifter shaft. When the rod is pulled in the direction of arrow N the gear B meshes with gear A of the countershaft and the latter being a large one, the countershaft moves slowly and by means of the gear E transmits the power to the gear H and then to the driving pinion. This is first speed. Second speed requires that the rod be moved in the direction of arrow M and then gears C and D are

made to mesh, and the power is transmitted in the same way to the driving pinion. For high speed the rod is moved as far as possible in the direction M, so that the gear C meshes with the internal teeth of the gear H. This is also called direct drive.

3—Production is at its height from February to May and in some factories from December to June or July.

4—The M. & S., a spiral gear differential, depends for its action upon the friction between the gears.

5—A large map, the size of four of these pages, was a supplement to last week's Motor Age.

### HIS CAR HAS A LEAKY RADIATOR

Soldering the Break Is the Best Method—

#### Compound May Help

Double Bayou—Editor Motor Age—I have been having trouble with a model L Schebler carburetor. The motor is hard to start and after running a while the carburetor feeds too rich a mixture. When the float is pressed to move it up and down, the motor speeds up, the valve seems to stick. Kindly give the adjustments.

2—The radiator on my Ford leaks. I think it is cracked from a freeze. Does Motor Age advise using the radiator compound?—E. G. Dinsdale.

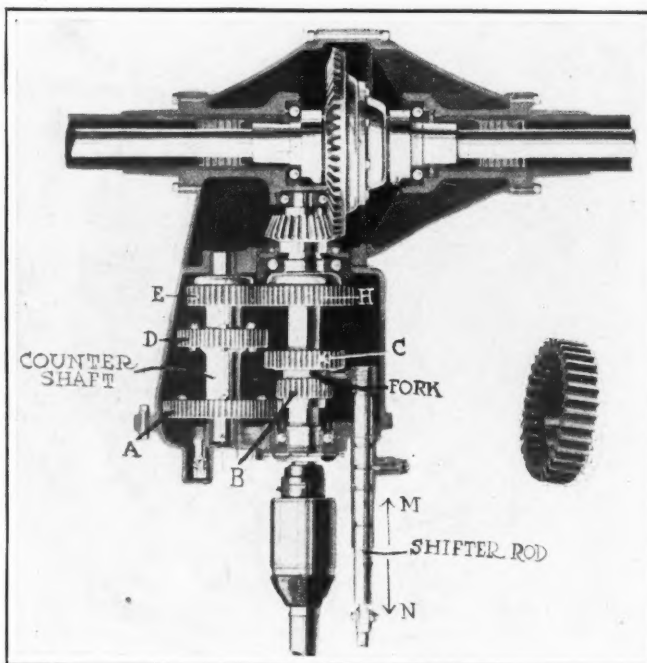


Fig. 5—Construction of a progressive gearset in which high speed is reached only by going through second. The shifter fork is attached to the gearshift lever

1—See answer to R. F. Stephens on the previous page.

2—If the crack is not too great, radiator compounds may stop the leak. Otherwise the radiator must be soldered. You can purchase radiator compound at any supply store.

#### Inclosing Car for Winter

Woonsocket, S. D.—Editor Motor Age—The illustration in Fig. 1 shows how a Hupmobile was equipped with curtains for winter use. The frame of the door is a piece of 3/8-inch umbrella tubing stiffened at the

bottom with a 3/8-inch wire. The bottom is shaped like a W laid horizontal, the points of which are held in slots under the door moulding.—R. E. Stevens.

### FIRING OF SIX-CYLINDER MAGNETO

Armature Travels 1 1/2 Times Crankshaft—

#### Distributor Half As Fast

Bloomington, Wis.—Editor Motor Age—I notice Motor Age in the issue of February 11 says that a six-cylinder starts with greater ease due to the chances of its getting an explosion out of the three charges on one round of the crankshaft. Also that the armature of a magneto goes at half crankshaft speed.

If there are three explosions to one round of the crankshaft in a six; and the breaker points of a magneto separate at every half revolution of the armature, then I should think that the armature of a magneto would have to go one and one-half rounds to get the three sparks required for the three explosions that occur on one round of the crankshaft. Am I correct?—Clifford Raisbeck.

Motor Age should have stated that the magneto distributor travels one-half as fast as the crankshaft. The armature of a six travels one and one-half times as fast as the crankshaft.

### USING CAR FOR RUNNING DYNAMO

North Dakota Reader to Use Belts From

#### Rear Wheels—Cooling Hint

Milton, N. Dak.—Will Motor Age please express its opinion as to whether the following idea of running a generator of 60 volts and 42 amperes is practical? My idea is to use a Ford or other light car to provide power for running the generator for an electric moving picture machine. As the flywheel of the Ford is inclosed I thought that the best way would be to run a countershaft directly above the rear wheels and run a belt from both wheels to this shaft, either from pulleys of the same size, bolted to the wheels or from the wheels themselves; but to have two belts, one from each rear wheel so as to do away with the working and unnecessary wear of the differential.

2—At what speed would it be best to run the engine to give the best results and sufficient power to run the generator at full speed in case of an overload?

3—Would it be necessary to aid the cooling system of the Ford in any way to keep the motor cool, and what would be the best way?

4—Would a throttle governor be necessary, and if so, where could one be obtained that could be easily attached so as to be used when running the generator and out of use when driving the car?—Rolf From.

1—This could be made to do the work.

2—Depends up on the speed and regulation curve of the generator.

3—Yes. If city water mains are at hand, connect to mains, so that fresh water flows through jackets.

4—Depends upon regulation of generator. It will be better

to put a governor on the shaft of the generator.

### LARGE TIRES FOR EASY RIDING

Will Also Show Economy in the End

#### Carrying Capacities

Crawfordsville, Ia.—Editor Motor Age—Will a 4-inch tire support nearly twice the same weight as a 3-inch tire at the same pressure? Or, will not a 4-inch tire hold load at a little more than one-half the pressure of the 3-inch?

2—In regard to inflating oversized tires. If it were possible to put a 5-inch tire on a Ford front wheel and inflate to 60 pounds would not the 5-inch be rougher on a choppy road, or when it hit a high crossing than the 3-inch, on account of so many more square inches of tire sur-



face being in contact with the ground?—C. M. Stram.

1—The carrying capacity of the average 4-inch tire is about 750 pounds when the tires are pumped to 80 pounds pressure and that of the 3-inch tire 450 pounds when the tire is pumped to 60 pounds pressure. The 4-inch tire, while it is designed to carry not quite twice that of the 3-inch casing, a reduction in pressure will reduce its carrying capacity.

2—The larger tire under 60 pounds pressure would give much easier riding than the 3-inch tire pumped to its correct pressure. For a given car the larger the tire the lower you can carry the pressure and the better will be the riding qualities.

### THE HORSEPOWER OF TWO MOTORS Size Is Not Necessarily An Indication of the Power

South Omaha, Neb.—Editor Motor Age—The 1915 Mercer, four-cylinder car, 3 3/4 by 6 3/4, with an S. A. E. rating of 22 1/2 is said by the Mercer people to develop 70 brake horsepower and guarantee a speed of 80 miles per hour. I have an Interstate M 45 Six, 4 by 5, pressure feed, rated S. A. E. 38.3 which develops only about 50 horsepower and 48 miles per hour, maximum speed. The latter has the greater displacement. Why does the Mercer develop so much greater brake horsepower?

2—Would the vacuum feed system tend to increase the power of the engine?

3—Would another type of carburetor tend to increase the power?—V. Vacek.

1—The one is a comparatively high-speed engine, while the other is not. The speed and power depend more on the design and workmanship than they do on piston displacement.

2—Possibly.

3—A model designed specially for high-speed, might.

### DURAY'S RECORD MADE AT OSTEND Traveled 142.9 Miles Per Hour in a 300- Horsepower Fiat

Williamstown, Mass.—Editor Motor Age—What was Duray's speed record, and when and where it was made?

2—Kindly give a brief description of his car.

3—Give the names of manufacturers making four-cylinder cars costing over \$2,000.

4—When is the Troy show to be held?

5—When is the motor car show at Springfield, Mass., to be held?

6—What is the maximum speed of the two-passenger models of the following cars: Fiat, Simplex, Cadillac, Chadwick, F. R. P.?

7—Why was there no mention or illustration of the Mercer car in either the New York or Chicago show issues of Motor Age? It was omitted in the specification table of American 1915 models, and also in the list of two-passenger runabouts.—Uki.

1—Flying kilometer, speed 142.9 miles per hour, at Ostend, December 16, 1913.

2—Three hundred-horsepower Fiat, four-cylinder, 7.48 by 10.4 inches, overhead camshaft, two carburetors, chain drive.

3—See Buyers' Guide, Motor Age issue of December 31.

4—Closed February 13.

5—March 4.

6—All about 60 miles per hour, or over.

7—Mercer program was not complete when that data was compiled.

### Hints on Starting a Ford

Salt Lake City, Utah—Editor Motor Age—If one will loosen the cross chain and reverse same by turning it over twice as much wear can be obtained.

I drive a 1913 Ford car and do not have a warm place to keep it. We have had very cold weather and it was impossible to start my car unless the back wheel was jacked up and hot water poured on the manifold. By doing this, in the very coldest weather, about three or four turns would start the engine. The oil in the timer gets thick, but this seems to be the best method.—T. P. Willits.

### WANTS TO REVERSE BRUSH GEARSET Cannot Be Done By Changes in the Unit— A Possible Method

Round Lake, Minn.—Editor Motor Age—Would a four-cylinder engine such as the Ford, which is supposed to be run right-handed, run as well left-handed if timed right?

2—What would one have to change in a Brush inclosed planetary transmission to reverse its direction or run it the opposite way from which it was made to run (which was to the left)? Would changing the large internal gear to the opposite side of the drive gear do it?—A Subscriber.

1—Yes.

2—There is no way that the planetary set can be changed so as to get it to run in the opposite direction, but, however, if you wish the motor to turn in the opposite direction from that of the Brush the

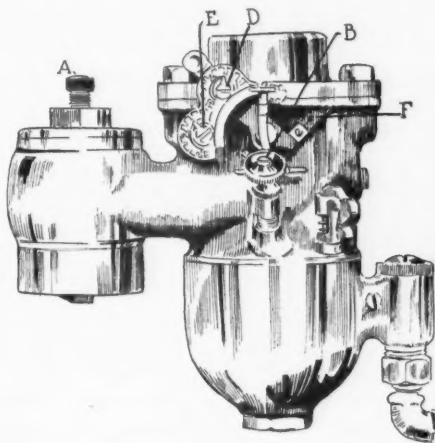


Fig. 6—Schebler carburetor model L showing the various adjustment points

only way such a motor can be used is by turning the differential and jackshaft assembly end for end, which would then place the oil plug in the differential housing, which is at the present time upon the top, underneath. In doing this it would change the drive gear in the differential to the opposite side of the bevel pinion.

### Questions on Horsepower

Seattle, Wash.—Editor Motor Age—In the December 31 issue of Motor Age, page 40, I notice the Pullman Junior is quoted as having 22.50 horsepower, while on page 80 of the same issue the rating is 25.60 horsepower. Will you kindly explain this difference?

2—Also why does the S. A. E. apparently not consider the piston stroke in figuring horsepower? Would be glad to receive a formula for figuring exact horsepower.—C. A. Neal.

1—The Pullman Junior with a bore of 3 3/4 has an S. A. E. rating of 22.5 horsepower. The ratings on page 80 of the issue mentioned are incorrect.

2—The stroke is considered in this formula but indirectly. This is explained fully in the February 11 issue of Motor

Age in the Readers' Clearing House department.

### CARBON REMOVING WITH ALCOHOL Cylinder Should Be Filled to Capacity— Using Oversize Tires

Oglesby, Ill.—Editor Motor Age—Will a spring which is nearly flat wear out as quickly as the spring which is used on the Mercer 1915 model?

2—If the disadvantage of a six-cylinder car is the long crankshaft, and three power strokes, every revolution is enough to have an even torque, why could not two blocks of three each be set in V-type? This would make for an even shorter crankshaft.

3—Why does the S. A. E. rate the horsepower of an engine at 1,000 r. p. m. instead of the maximum horsepower that it will develop?

4—Why does the Stewart Vacuum feed increase gasoline mileage?

5—In using denatured alcohol as a carbon remover, how much should be used in each cylinder, and should it be allowed to stand for 12 hours or so before using again?

6—If an eight-cylinder engine gives a sufficiently even torque, why do some firms use twelve or sixteen cylinders? Can this make for a still more even torque, and is the advantage gained worth the more costly expense of manufacture? Will not the upkeep suffer as well as the gasoline consumption?

7—On a rim which is made for 36 by 4 1/2 tires, the oversize is 37 by 5 inches. Why could not a 38 by 5 1/2-inch tire be put on? The inside diameter would still be 27 inches, and if the oversize increases mileage, would not the 38 by 5 increase it so much more?

8—Where can a gear for a speedometer wheel be obtained? I am changing from the regular size tire to the oversize, and wish to accurately record the mileage.—G. R. Bent.

1—The shape of a spring does not determine its life.

2—There are difficulties in obtaining proper balance.

3—Because there is no way of telling the maximum horsepower any individual motor will develop without making a brake test of the engine.

4—It will save fuel over a pressure feed system because of the pressure being constant, but it will not always show economy over a gravity system. It may, however, depending upon the installation.

5—The piston of the cylinder should be on top dead center and both valves closed. The cylinder should then be filled to capacity with the alcohol. This should remain in the cylinder at least 6 hours and preferably 12 hours. The cylinders should be hot when the alcohol is poured into them.

6—Twelve and sixteen cylinder motors have up to this time not been used for ordinary work. In racing practice and aeroplanes they have found application. Engineers have not come to any decision, up to this time, as regards the desirability of using more than eight cylinders.

7—The standard 38 by 5 1/2 tire has too thick a bead. Special tires of this size are made with small beads, which will fit.

8—From the nearest service station of the maker of your speedometer?

### Speed of Six-Cylinder Magneto

Brooklyn, N. Y.—Editor Motor Age—In a recent issue of Motor it was stated that the magneto of a six-cylinder motor turns at one-half engine speed. Do you refer to the armature?—H. E. B.

The armature of a six-cylinder magneto turns at 1 1/2 times engine speed and the distributor at 1/2 the crankshaft speed. The distributors of four and six-cylinder motors turn at the same speed, the armature speeds differ, however, as mentioned.

# Newly Designed Knox Tractor Has Hydraulic Brakes

## Centralized Control Board and Odd Spring Suspension

**T**HE Knox Motors Co., Springfield, Mass., has brought out a 10-ton four-wheel, chain-drive tractor of new design, incorporating in the chassis such features as hydraulic rear axle brakes, interlocking differential, automatic locking device for jackshaft brakes, control board between steering post and dash, and electric starting and lighting. Other noteworthy improvements are ball-bearing rocker arms for valve operation, a restriction of the power beyond the rated speed for heavy hauling without the use of the governor, oil pump freed of all pipe connections inside and outside of the motor.

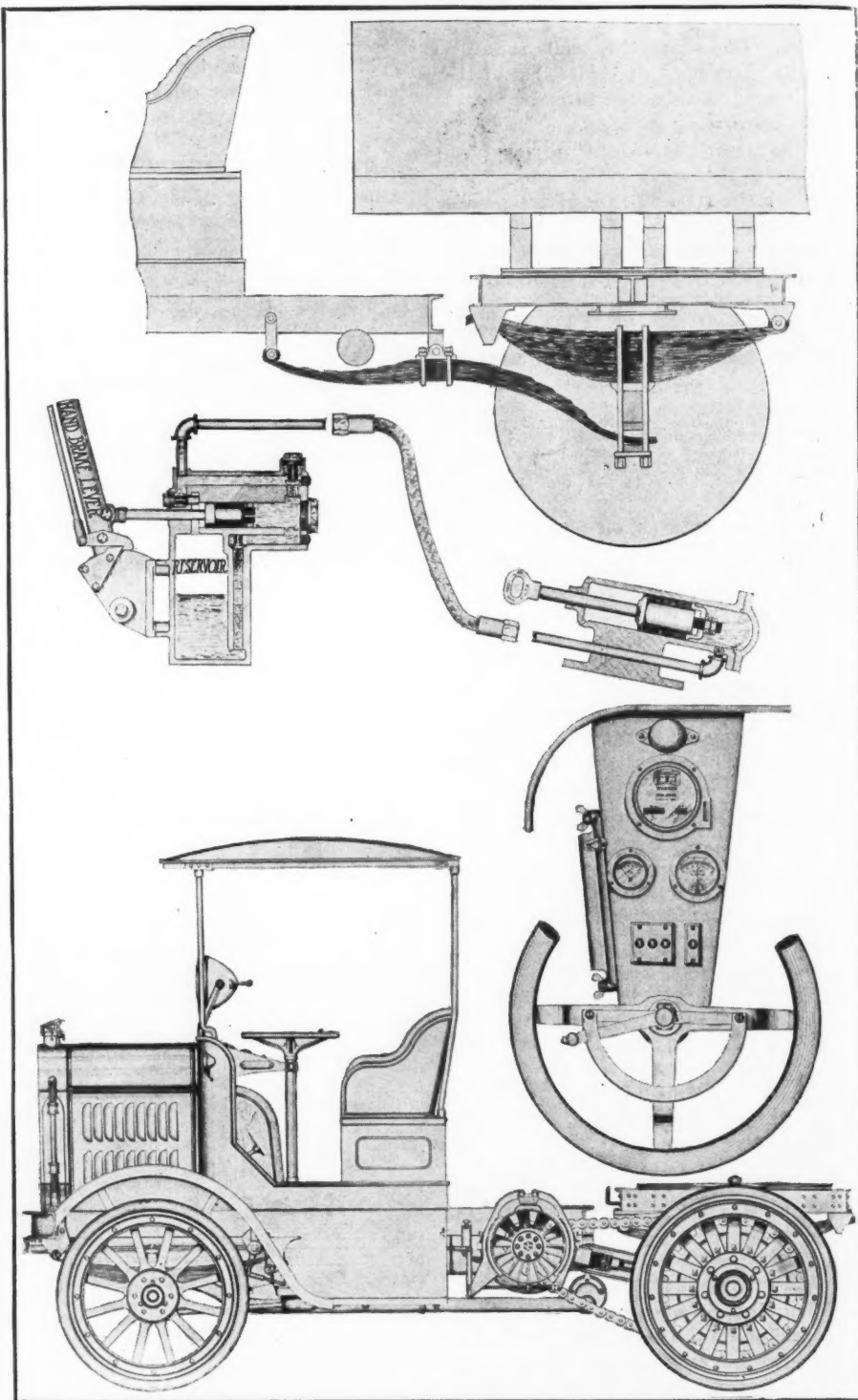
This new design of Knox tractor, known as the model 35, uses a four-cylinder overhead valve motor, 5 by 5½. No cages are employed for the valves. The cylinder heads are removable. Accessories of the motor, such as carbureter, magneto, Bijur cranking and lighting units, etc., are carried rather high, to be exact 31 inches from the ground, so that the tractor can travel safely through water almost as deep and still not have the units mentioned damaged.

The lubricating system of this motor is of the high-pressure force-feed type, the main duct being in the form of a steel pipe with the crankcase and from this duct holes communicate with the various bearings. The pressure regulating device discharges oil over the timing gears. The oil pump hangs from the upper portion of the crankcase and as mentioned previously has no external or internal pipe leads. A large screen completely covers this pump, which is fastened to a bronze skeleton housing integral with a cap bolted to the crankcase lower half. The screen is easily removable without disturbing any of the other mechanism.

On the left side of the motor is the inlet and exhaust manifolds, the latter being fitted with cooling flanges and being of the reverse type, that is, the gases pass down in front of the motor and then to the muffler.

The gearset is of the selective type, three speeds forward and reverse with center control and uses an interlocking differential lock operated by a heel button in the floor at the driver's seat. Owing to the interlocking device the lock can not be used unless the gears are in the neutral position. This eliminates breakage of differential locks. With this new device the operator must bring the gears to the neutral position, which immediately stops the spinning wheel, before he can engage the lock. After engagement any speed may be used.

From the jackshaft the drive is by side chains to the rear wheels. The jackshaft is fitted with brakes operated by a foot pedal, which is automatically locked when



SOME FEATURES OF THE NEW KNOX TRACTOR

*The top illustration shows the odd type of rear spring suspension, the next illustration the hydraulic brake system which acts on the rear wheel brakes and is controlled by a hand lever much the same as an emergency brake. At the bottom is the complete tractor and in the detail at the right, the control board which extends from the steering post to the dash*

desired. The brake shoes on the jackshaft are cast iron operating against cast steel drums of 14 inches diameter and 4-inch face. The drums have a large number of cooling fins.

The hand brake, which is located be-

tween the two seats alongside the change-speed lever, operates an hydraulic pump bolted to the top of the gearset housing and this lever, by an ingenious arrangement, operates in the same manner as the ordinary hand brake, pulling back to ap-



ply the brake and forward to release it. The brakes are so designed that they will hold the tractor on a grade, when abandoned by the driver. Hydraulic cylinders are bolted to the strut rods and operate on the break levers at the rear axle. The rear axle brakes are internally applied and are of 20 inches diameter and 6½ inches face steel spring bands lined with Raybestos. The hydraulic brakes eliminate the necessity of brake rod adjustment when adjusting the driving chains.

#### Unusual Rear Suspension

It will be seen in the illustration herewith that the frame does not extend to the rear axle and that the rear axle is isolated from the chassis proper. The cantilever springs supporting the chassis proper are resting at their rear ends in slide-ways under the rear axle. The rear axle is driven by the driving chains while the distance rods maintain it in line, it being at liberty to move up and down equally or unequally without motion of

the chassis proper. The rear axle rotates in the rear bracket of the distance rods, and as the springs supporting the trailer platform are fastened to the rear axle itself, the trailer platform is at liberty to remain parallel to the body of the trailer and at the same time give the full support to the front end of the trailer by means of the circle plate. A draw-bar device with springs is attached to maintain the trailer platform in a horizontal position when running without the trailer.

The Knox has a wheelbase of 108½ inches and uses single 36 by 4 solid tires in front and 38 by 6 dual tires in the rear.

The price, including the following standard equipment, is \$4,500: Trailer platform complete, two electric side lamps, electric tail lamp, large swinging search light, storage battery, two heavy jacks, for removing trailer from tractor, mechanical horn, fire extinguisher, speedometer, electric lighting and starting system, cab and side curtains complete.

## White Has New Power Hoisting Body Installed on 1½ Ton Chassis for Coal Delivery

THERE has just been brought out by the White Co., Cleveland, O., a new type of power hoisting body on a special 1½-ton truck, designed especially for the rapid discharge of coal into basement windows, manholes, etc., in the congested sections of the cities where coal receptacles are not readily accessible to many of the present types of coal trucks. The new White job utilizes the principle of worm-operated lever arms. As shown in the illustrations herewith the body is raised completely from the chassis so that the structural work is extended leaving the coal compartment high in the air, comparatively, and the chute running from the center of the floor, which is shaped like a pyramid turned upside down. The body may be raised, it is stated, in 30 seconds, and the chute may be used on either the right or left side. The rapidity with which the load may be made ready for expulsion from the body together with the fact that the chute may be used on either side, make the new White a desirable type of coal truck in the larger cities.

The body has a capacity of 72 cubic feet. It is elevated by four lever arms which move much the same as the human

arm moves in lifting a weight from the shoulder to a point above the head. Two lever arms in the front and two in the rear are attached to the ends of transverse shafts which are turned by worms and gears. The worms are driven by sprocket and chain from a longitudinal shaft and this shaft is driven by the power transmission of the truck.

When the body is being hoisted or lowered, its vertical stability is maintained by four legs which slide up and down in four guides mounted upon, and braced from, the frame of the truck. The mechanism is built with an automatic shut-off which is brought into action when the body reaches the extreme top and bottom positions.

#### FARMERS IN CO-OPERATIVE DEAL

New York, Feb. 27—Fifty farmers owning farms in Ocean and Monmouth counties, New Jersey, have recently purchased four 5-ton second-hand motor trucks and are operating them on a co-operative plan to deliver their products to the markets of Atlantic City, Lakewood and Asbury Park. The trucks are run on regular routes, stopping at the farm of

each member of the fifty, picking up the goods he wishes to send to market. At the present time, the charge is 9 per cent of the selling price of the goods at the market, although it is expected that this cost will be reduced considerably with the growth of the service.

The trucks have been in operation for 3 months and have so far proven very successful. The trucks bring out from town such articles as the shippers may desire, thus permitting the vehicles to be run under load as much of the time as possible. An extension of the plan into wider areas is contemplated and the originators of the plan are confident that when this is done the charge will be considerably decreased.

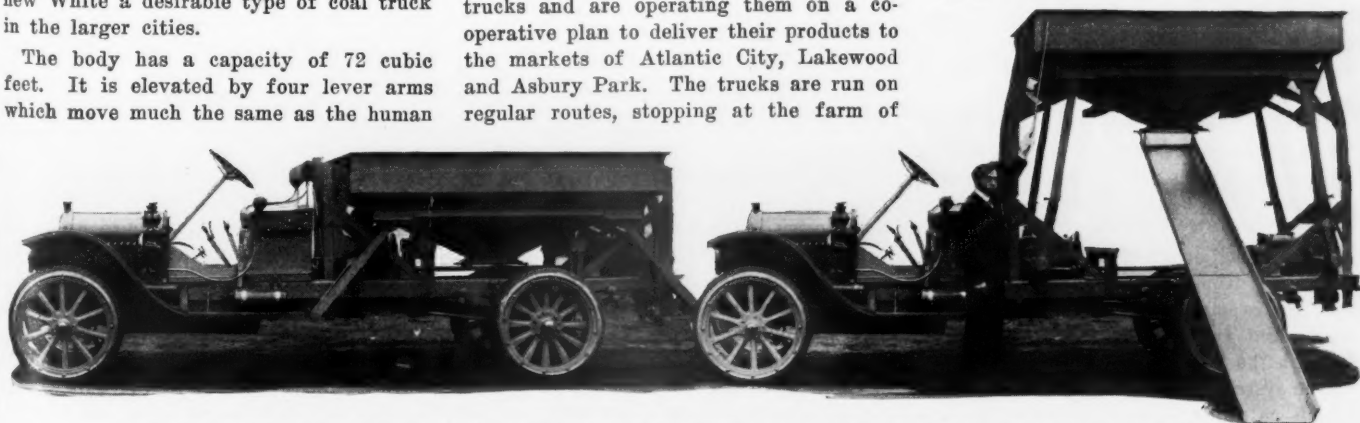
The plan has proven of especial benefit to the small shippers, who previously had to hitch up a horse and wagon to take their goods to the market, spend the greater part of the day in getting there and back, only to find that their goods were actually sold at a loss. The co-operative plan eliminates this condition entirely because it does away with the duplication of trips to town with part loads.

None of the farmers who are members of the plan could afford to purchase a truck for himself, so that some form of co-operative scheme was the only remedy. The trucks were purchased for \$7,200, or an average of \$1,800 per vehicle, but as there are fifty farmers in the group, the average investment of each was but \$144.

#### TRAILERS SHOW TIRE EFFICIENCY

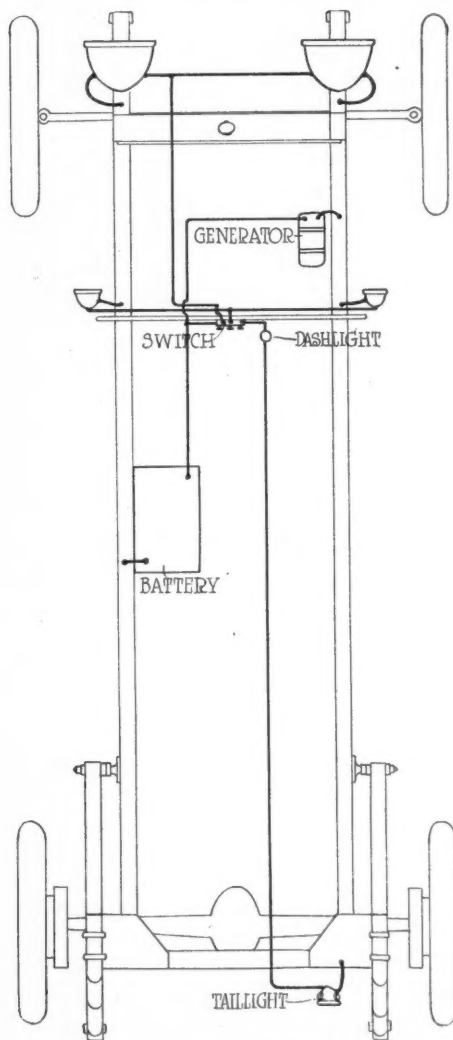
Akron, O., Feb. 26—The Goodyear Tire and Rubber Co., of this city, has completed a test of a 3½-ton G. M. C. gasoline truck, pulling two Troy trailers, over a 3,750-mile course, for the purpose of determining the wearing qualities of motor truck tires when the vehicle is used to haul trailers.

At the end of the test, J. E. Hale, head of the experimental department of the Goodyear company, is quoted as saying that the results proved conclusively that a truck can be used in connection with trailers. No difficulty was experienced in handling the two trailers and it is his opinion that five could have been handled provided adequate power, etc., were provided.



SHOWING THE NEW WHITE COAL-CARRYING TRUCK WITH THE COMPARTMENT DOWN AND ALSO RAISED

# The Single vs. the Two-Wire Method of Wiring Cars



**THE SINGLE-WIRE SYSTEM**

In this, every unit has one side grounded. The current is conducted from the battery to the lights by a single wire and the return circuit is through the frame of the car or through a metal conduit housing the wire. The single-wire system sometimes is called the grounded system.

WHEN electric lighting equipment came into general use on motor cars, one of the first subjects which came up for discussion was the method of wiring. There were two systems from which to choose, the single-wire installation, and the two-wire installation, and since then there has been a difference of opinion regarding the relative merits of each, which still is being warmly argued by engineers.

In order to get a clear understanding of the arguments set forth for each system and against each system, a true conception of wiring methods must be in one's mind.

In the single-wire system the current is conducted from its source, a storage battery for example, by a single wire to the lamps and then returned to the battery through the frame of the car. Every unit of the system has one side attached to the frame, as shown in an illustration on this

Arguments Set Forth by the Adherents of each System

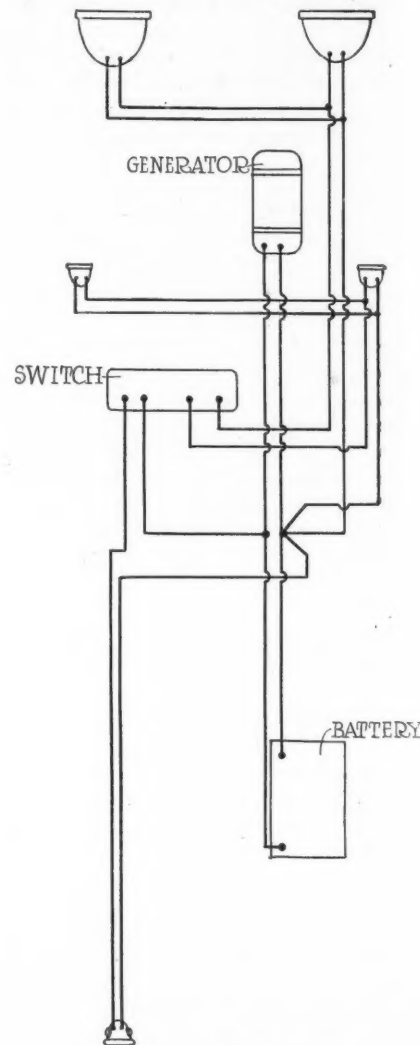
## CLAIMS OF THE SINGLE-WIRE ADHERENTS

*Simplicity, ease of tracing trouble and rewiring, better insulation and contacts possible. Simpler and better accessories, such as lamps, etc., absence of congestion at switches and terminal boxes and large-size conduits possible.*

\* \*

## CLAIMS OF THE DOUBLE-WIRE FOLLOWERS

*Danger from short circuits largely eliminated, voltage drop not as great as in one-wire, no trouble from interference with other electrical apparatus, fuses not necessary for safety, and insulation need not be of the best.*



**THE DOUBLE-WIRE SYSTEM**

Here there are two wires leading to every unit instead of one. There are no grounded circuits and the current from the battery leaves by one wire, travels to the lamps, etc., and returns to the battery again by another wire, the frame playing no part as a conductor of electricity.

page, hence the current leaves by the wire and returns by the frame. This is sometimes referred to as the grounded system, because one side of each unit is grounded—attached to the frame. In the double-wire system there are no ground wires, for the current leaves the battery by one wire and returns by another wire, the frame of the car playing no part as a conductor of electricity. So, we have, in the single system, one wire to each lamp, battery, generator, etc., and in the double-system two wires to each part of the system.

### Superiority Difficult to Decide

While it is possible to show that for certain practice one system is better than the other, it is rather a difficult matter to decide the question when the lighting system of a motor car is under discussion.

Those favoring the single-wire system claim simplicity, greater stability, ease of

tracing trouble and rewiring, better insulation and contacts possible as the main advantages, while the adherents of the two-wire system contend that danger from short circuits are eliminated largely in their system, the insulation need not necessarily be thick and of the best material and hence the cost is cut down, there is no chance of interference with other apparatus and loose connections, poor insulation, etc., will not cause serious trouble, such as a short-circuit.

In the single-wire system simplicity of construction is a strong point in its favor. With only one wire leading to each unit the inexperienced operator is better able to find trouble, and since in motor-car lighting systems much of the trouble is with the wiring, bulbs and contacts, this seems a strong claim. In this system with only one wire leading to the bulb socket a more substantial construction is possible



than if two wires close together were led into the socket, as is the case in the double-wire system. The one wire leading to the socket makes it possible to make the contact point better by paying attention to soldering, whereas in the two-wire system the wires being close together, it is difficult to get a good soldered connection. The use of one wire makes possible the housing of it in a conduit of large size and, if this were done in the two-wire system, the cost would increase and complications set in.

Switch simplification and terminal box congestion is relieved in the single-wire system and should any trouble result at either of these places one-half the number of wires need be handled to find the faulty one. If there is a ground caused by the insulation of the single wiring cutting through, or by some other cause, it is easy to find it, because only one wire need be followed from one end to the other, whereas in the two-wire system twice the work is necessary unless the operator can point immediately to the trouble-giving section. This is hardly possible in all cases.

#### Easy to Rewire the Car

In rewiring the car after overhauling, or in making connections at any other time, it is comparatively easy for the owner to avoid cross-connections.

There are a number of minor claims for this system, one of them being that it is in use on steamships to a great extent and voltages as high as 800 are utilized in single-wire installations and no troubles have resulted. Since it is being used successfully in other branches and even with high voltages, its use in cars should be equally successful.

While the one-wire system has its advantages, there are a number of two-wire enthusiasts who bring to light objections which they claim are of a serious nature. In all such discussions, the very first statement against this system is the danger resulting from short circuits. One accidental ground will cause a short circuit. For example, if one of the wires leading to a lamp or other unit should touch the frame or some metal part directly or indirectly connected with the frame, a short circuit will result. It is possible for one wire to touch by broken insulation, a break of one of the contact points, caused by vibration or excessive heat. It is pointed out that in the two-wire system it takes two grounds to cause a short circuit, hence two wires must have their cur-

rents meet and the wearing of insulation on one wire will not cause a short circuit.

Statements are made also that for safety the circuits must be fused just as the lighting circuits in your home are fused. Fuses make a system complicated and, further, the fuses themselves may become loose and cause trouble. While many two-wire systems do not use fuses, it is claimed their use makes the system that much more reliable.

#### Insulation a Factor

The insulation throughout of a one-wire system must be of the best, the connections at the grounding points must be perfect and protected in some way from the action of water, oil, etc.

The trend at present is toward placing

the single wire in a flexible metal conduit and using the same conduit as the grounding medium, thereby obtaining a construction which is short-circuit proof to a great extent and also prevents an appreciable drop in voltage and considerably less than frame of the car shows.

Those opposed to the one-wire system bring up the subject of accessories and voltage. It is stated that in high-voltage systems complications may result which will interfere with the starting motor and other electrical apparatus because of the common ground. In some one-wire systems the ground is made through the lamp bracket and should this become loose the light will flicker and perhaps not burn at all. Good operation depends upon the lamp being tightly screwed in the socket and the insulation of the accessories must be of the best, because an insulation break will cause trouble.

#### Accessories Are Considered

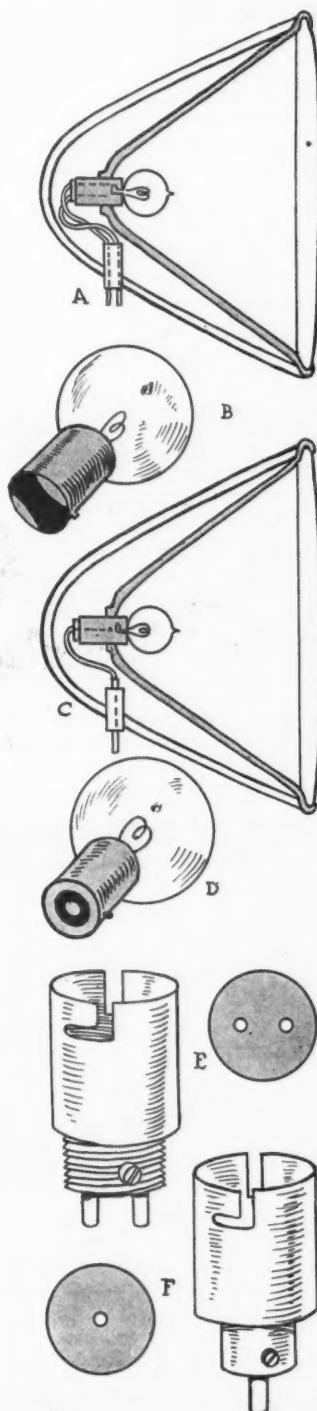
Because there is only one wire leading to the socket, the shell forming the lead to ground lamps of a certain type are needed and it has been shown that at present it is a difficult matter to obtain the proper lamps at certain points because dealers do not want to handle a large stock of them. Breakage is great, the profit small and hence they will stock up with as few different types and voltages as possible. But this objection is overcome largely by the fact that dealers now are beginning to realize that the one-wire system is making a gain in the number of manufacturers using it and it follows that they will stock up with the proper type of bulbs to meet the demands of motorists.

In the one-wire system a man working about the car can easily cause trouble by making accidental shorts with a metal tool. Short circuits cause arcing and especially if the gasoline tank is in the cowl or the fuel line connections near lighting wires, trouble from fire may result.

#### Safety in Double-Wire System

Safety seems to be the double-wire claimant's stronghold. Short circuits are not as liable to occur, because both sides of the circuit are insulated and both conductors must meet in some way to cause a short circuit.

The voltage drop is claimed not to be as great in this system as in the single-wire. To make the two-wire system safe, it is claimed, fuses are necessary, just as they are in the grounded-return system. This brings up the cost of the installation and adds complications.



A shows how a large bulb is wired in the lamp of a two-wire system. These two wires, close together, leading to the socket, are claimed by the single-wire adherents to interfere with the making of good connections

B shows a bulb used in a double-wire system. Note that the base has two contacts

C shows how the bulb of a one-wire system is connected. The single wire leading to the socket is claimed to offer a means of obtaining a good connection. It is simpler than the two-wire method

D shows a bulb used in a one-wire system. The base has only one contact point and that is in the center

E shows the socket of a two-wire system, and the small illustration at the right is a top view of this socket. There are two terminals as shown

F shows the socket of a one-wire system. There is only one contact piece and it is claimed a better and neater job can be made and one more immune to trouble than the two-wire



# The Accessory Corner

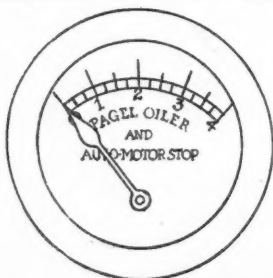
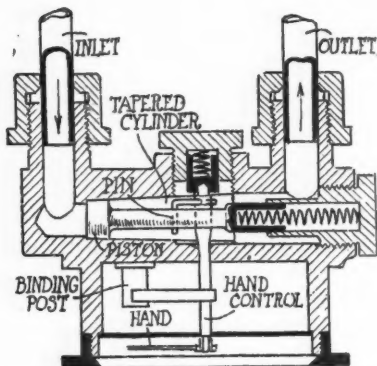


Fig. 1—Pagel oil sight feed which indicates oil flow by means of a hand working across a dial. This instrument will stop the motor if oil discontinues to flow

## Pagel Sight Feed

**A**N UNUSUAL form of oil sight feed, in which indications are made by a hand working across a dial, has just been announced by the W. F. Pagel Co., 133 West Washington street, Chicago. But this sight feed has another decided feature, that of causing the motor to stop should the oil discontinue to flow. The illustration in Fig. 1 shows quite clearly how the Pagel operates and how it accomplishes the feat of stopping the motor when the oil flow ceases. The oil enters the sight feed through the opening at the left and on its way forces a piston backward. This piston operates in a tapered cylinder. The oil flows past the piston and out through the opening at the right of the illustration. The movement of the piston, however, causes the hand control to rotate. The small angle pin shown being connected to both pistons and control, it is clear that any lateral movement of the piston will give the pin circular motion and thus cause the hand to rotate. The hand control has attached to it a small piece of metal. When the hand is at zero on the dial the metal touches the insulated binding post to which is attached one of the ignition wires. This causes an open circuit to be made and hence stoppage of the motor. The illustration also shows the dial of the Pagel. Price is \$2.

## Baxter Portable Cooking Outfit.

For those tourists who desire to spend

many days outdoors and cooking their own food, the outfit, shown in Fig. 8, made by W. E. Baxter, Louisville, Ky., will be found desirable. The Baxter is a combination portable stove and cooking and serving outfit, weighing approximately 15 pounds and containing a water reservoir and the necessary utensils for six persons.

Besides these articles there is a stove which may be quickly packed and unpacked. The illustration in Fig. 8 shows it in both positions. When not in use the stove forms a convenient means of carrying some other parts. Wood is used as fuel and the firebox is large enough to hold wood 16 inches in length.

Inside the fire box is placed the 5-gallon water reservoir, which also may be used in making soups, boiling food, etc. Price of the entire outfit is \$15. The stove alone sells for \$7.50 and the stove and reservoir \$9.75.

## Economy Gasoline Improver

The Inst Lighter Co., Columbus, O., has brought out a fuel-heating device in the

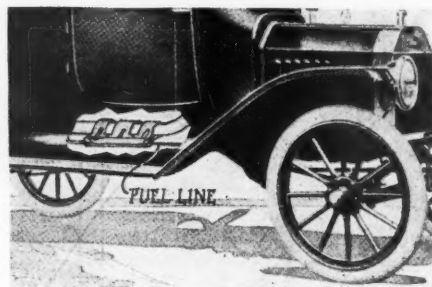


Fig. 2—Economy Gasoline Improver installed. The fuel line passes through the Economy; thus the fuel is heated and vaporizes more easily when it reaches the carburetor



Fig. 3—Ever-Ready Fountain Pen Light, which is an unusual form of flash or trouble light. It has a clip so that it may be carried in a vest pocket

form of a box which is clamped to the exhaust pipe, as shown in Fig. 2. The fuel line is made to pass through this heater and in this way some of the heat from around the pipe is used to warm the gasoline making it more easily vaporized when it reaches the carburetor. The concern claims that this pre-heating of the fuel results in a saving in the fuel bill of one-third and also is contributory to an increase in power. The device sells for \$2.75 and is attached easily by any owner.

## Fountain Pen Light

A trouble light that is unusual in form, in that it is shaped like a large fountain

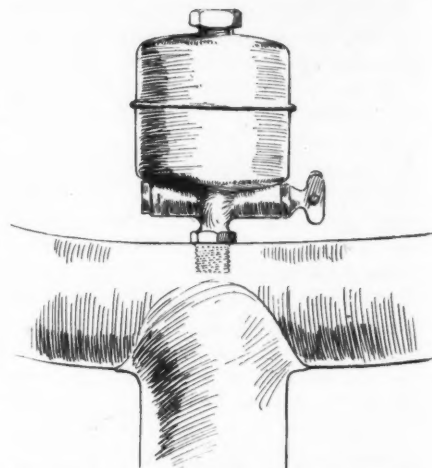


Fig. 4—Woolf lubricator which automatically feeds graphite to the cylinders

pen, is announced by the American Ever Ready Co., New York. It is called the Fountain Pen light and is 5 1/4 inches long, 3/4 inch diameter and weighs 1 1/2 ounces. The current source is a dry cell which supplies a tungsten bulb. The control is such that the light may be flashed or burned continuously and laid down so that both hands may be free to work. The Fountain Pen light is shown in Fig. 3. It has a clip similar to that used on fountain pens, so that the lamp may be carried in the vest pocket. Price is \$1 with battery.

## King Tire Protector

A form of tire protector which allows of the casing being cooled is announced by the King Tire Protector Co., 166 East Erie street, Chicago. The King is made of leather and canvas and is attached by means of tabs, as shown in Fig. 5. Between the tabs are spaces which allow of the air taking away the heat generated. The protector is built up of layers of



Fig. 5—King tire protector, which has tabs at its sides, the spaces between allowing of air reaching the casing. The protector material is leather and canvas and the tread is fitted with steel studs



leather reinforced with canvas, and a gripping surface being provided by a large number of steel studs. Application is simple. Prices range from \$10 for the 28 by 3-inch size to \$28 for the 36 by 5.

#### Jones Manifold Lock

Preventing theft of the car by blocking the inlet manifold so that no mixture can reach the cylinders, is accomplished by the Jones Manifold Lock, brought out by the Jones Auto Lock Co., Tacoma, Wash. The lock is operated by a combination, known only to the driver and when this combination is made on the lock control, a brass cylinder blocks the passage between carburetor and cylinders, thus preventing the flow of gas. The illustration in Fig. 7 shows the position of the lock when installed and the control rod extending to the dash of the car. The lock itself is attached to a special manifold made of cast aluminum.

#### Autrec Rectifier

An electrolytic rectifier for 100 to 125 volt circuits of 60 and 25 cycles is mar-

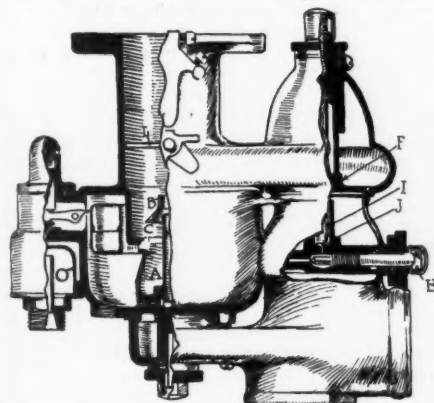


Fig. 6—View of the Fritz carburetor, showing working parts

keted by the American Battery Co., 1134 Fulton street, Chicago. With this rectifier it is possible to charge from an alternating current source, batteries of from 6 to 24 volts, the process being very simple. The Autrec is the name of this device and it will pass a current of 2 amperes or a little lower if the battery voltage is high. In size it is no larger than an ordinary lighting battery, being 6¼ inches wide,

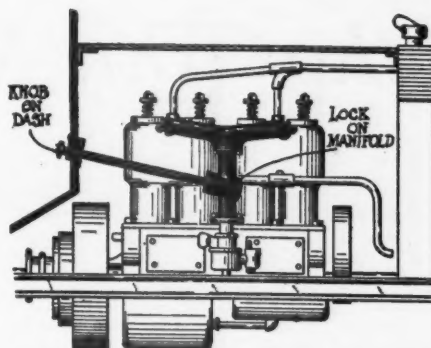


Fig. 7—Jones manifold lock which is operated by a combination known only to the driver. When locked it obstructs the passage between the carburetor and the cylinders, thus preventing the flow of mixture

12½ inches long and 11 inches high. Price for the Autrec for 100 to 125-volt circuits of 60 cycles is \$24, and for 110-volt 25 cycle lines the price is \$30. It is shown in Fig. 10 with an ammeter in place. It may be had without the meter also.

#### Fritz Carburetor

A new type of carburetor has been brought out by the Fritz Carburetor Co., Norristown, Pa. This device, shown in Figs. 6 and 9, is said to give the proper mixture of gasoline and air regardless of motor speed. The primary air is taken through the restricted passage A in Fig. 6 and is centered by means of the air jet B so that additional fuel is drawn through the jet C. The intermediate air valve F opens with the demands of the motor, and when the valve reaches its limit it causes a needle valve to be opened, thus feeding additional fuel to the motor. Every starting is obtained by means of an auxiliary jet controlled by a lever and the valve L. This lever is conveniently located on the dash or may project through the radiator. With this fuel may be drawn from the float chamber into the intake manifold, nearly all air being restricted by the automatic starting valve L. As soon as motor is started this valve automatically admits air.

#### Woolf Graphite Lubricator

A device which feeds graphite to the motor through the inlet manifold is an-

nounced by S. P. Woolf, 3024 Ames avenue, Omaha, Neb. The Woolf lubricator is in the form of a graphite retainer with a control and means of attachment to the manifold. When it is desired to feed a little graphite the control cock is opened and motor suction draws the graphite into the cylinders. Price is \$2.50.

#### Dicks' Aluminum Solder

E. M. Dicks, 241 W. Center street, Marion, O., is marketing an aluminum solder with which aluminum may be joined to copper, tin, zinc, or brass, and from the sample of work sent to Motor Age, the material is effective. A feature of this solder is that it is used with an ordinary soldering iron. A special flux is made and in joining two metals, this flux is first rubbed over a cleaned and scraped surface after which the parts are tinned with the solder.

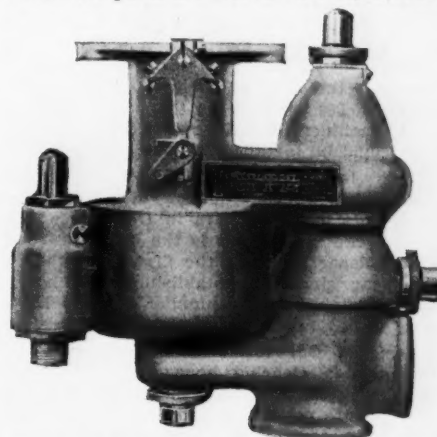


Fig. 9—Exterior view of the Fritz carburetor

After the portions of the parts to be joined are tinned they become united easily upon the second application of the solder. For heavy work such as large aluminum crankcases it is suggested the parts to be soldered be heated so as to remove the chill. A bar of solder and a bar of flux sell for \$2.

#### Lucas Heel Rest

J. L. Lucas & Son, 3 Fox street, Bridgeport, Conn., is marketing a heel rest which may be used for the brake, clutch or accelerator pedal. The device allows of the driver resting his foot in operating the pedal and in this way driving is not so tiresome. The rest is made of polished aluminum and is sold at 75 cents. There are four heights, ½, 1, 1½ and 2 inches.

#### Maker of J-M Shock Absorber

In the January 21 issue of Motor Age on page 64 it was stated that the J-M shock absorber, is made by the H. W. John-Manville Co. This is in error as the device is made by the J. M. Shock Absorber Co., Philadelphia, Pa.

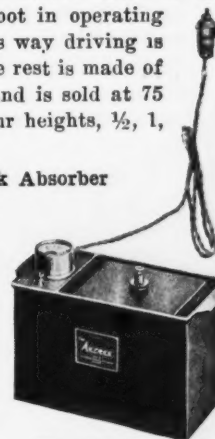


Fig. 10—Autrec electrolytic rectifier, which is made for lines of 100 to 125 volts and of 60 and 25 cycles

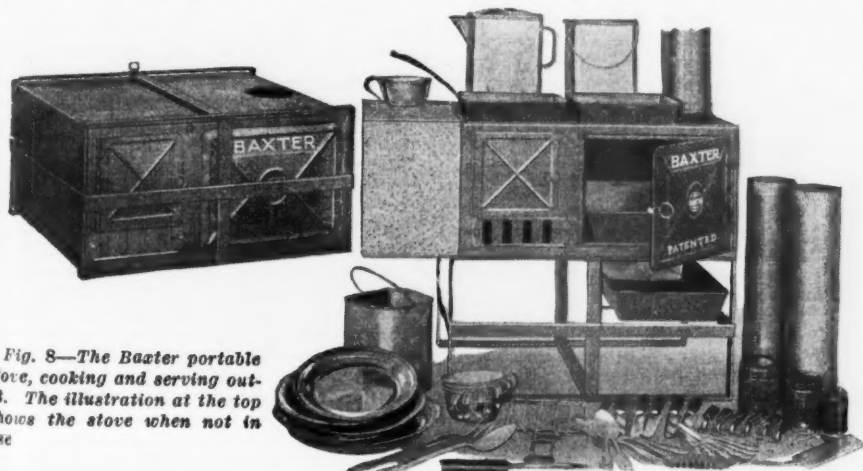


Fig. 8—The Baxter portable stove, cooking and serving outfit. The illustration at the top shows the stove when not in use



# From the Four Winds



**WOMAN Chauffeur Licensed**—Miss Elizabeth L. Miller of Hillsboro, O., was the first woman chauffeur licensed by the Ohio motor car department during the present year. Woman chauffeurs are rareties in Ohio.

**Club Run to Atlantic City**—At a meeting of the Chambersburg Motor Club of Chambersburg, Pa., it was decided to hold a "booster run" May 31 to Atlantic City, going via Lancaster and Philadelphia. At the same time the following officers of the club were re-elected: President, Dr. W. F. Skinner; vice-president, F. B. Reed; secretary-treasurer, Harry B. Ganoe.

**Convicts May Make Tags**—The Ohio state board of administration, which has charge of the penal institutions in the state, will soon recommend to Governor Willis the manufacture of all motor car tags by the prisoners in the institutions instead of paying about \$25,000 annually for them. It is claimed that machinery for the manufacture of the tags could be installed at small cost.

**Ohio Issues 85,000 Licenses**—Registrar Walker has issued practically 85,000 licenses to owners of motor cars in Ohio since the first of the year. This is the largest record in the department for the first 2 months of the year since its establishment. Chauffeurs' licenses to the number of 6,300 have been issued in the same time.

**Armored Car for Bank Collections**—The Philadelphia clearing house is contemplating the purchase of an armored motor truck to facilitate collections from outlying banks and trust companies. A demonstration of such a truck's possibilities in transportation has shown that the clearing house would be enabled to make collections from all the banks and trust companies in the city during the same day that checks and drafts are deposited, eliminating much of the annoyance incidental to loss through delay in the prompt presentation and payment or return of checks.

**Motor Cars Help Kenosha**—Attributable mainly to the motor car business of the city, Kenosha, Wis., is now the seventh city of Wisconsin, having risen from ninth place in 1913 and thirteenth place in 1910. The present population is 29,062, as of July 1, 1914, according to the estimates of the federal census bureau. Milwaukee is credited with 419,054 population and Racine is now in second place with 44,528, having distanced Superior, for 15 years the second city, which now has 44,344 people. Racine as well as Kenosha credit the motor car manufacturing business and allied industries for the gains.

**Booming Reo Highway**—The offer of R. E. Olds of Lansing, Mich., to pay \$300 per mile, in addition to the reward paid by the state, for the construction of good roads as part of a highway from Lansing to Detroit, has been accepted by three counties, Ingham, Oakland and Livingston, and the prospect is that before next fall there will be an excellent road from Lansing to Michigan's metropolis. The road is to be known as the Reo highway, and in all 40 miles of road have been planned, meaning an expenditure of \$12,000 on the part of the Lansing manufacturer. Parts of the contemplated road already have been built by counties between Lansing and Detroit, and Mr. Olds' plan contemplates the construction of other roads to connect them and the making of the highway the whole distance into a first class road. With the 40 miles accepted the

road will be complete as far as Farmington, which means the whole distance to Detroit, as the Wayne county roads offer an excellent highway the remaining part of the distance.

**Wants Road Funds for Counties**—A bill has been introduced in the Ohio general assembly providing that revenues secured from the registration of motor vehicles of all kinds go back to the counties from which they are derived, to be used for road improvement. At present all of the funds go into the state road fund.

**Plans More Concrete Road**—Milwaukee county, Wis., intends to get an early start on concrete road construction this year, having awarded contracts on February 20 for 9 miles of 18-foot roadway. Six miles will be added to Kilbourn road, giving a continuous concrete road from the southern city limits of Milwaukee to the south county line. The North Fond Du Lac road will be extended 3 miles to the north county line. About 30 miles of concrete road will be constructed this year, making a total of 85 in the county at the end of 1915.

**Chauffeurs Without Licenses Arrested**—As a result of an order by Chief Carter of Columbus, O., twenty-one chauffeurs were arrested recently within the space of several hours, on the charge of operating cars without licenses. Two patrols were kept busy hauling the offenders to the city prison where they gave bonds for their appearance in court. While the offenders were taken to jail, their cars were parked along the streets. The police department has undertaken to see that the chauffeurs' license law is obeyed.

**State Aid Proving Successful**—Since the creation of the state highway commission of Wisconsin and the distribution of state aid for permanent highway and bridge construction, 3,000 miles of permanent roadway, 3,000 culverts and 1,200 bridges have been built in Wisconsin, according to the report of John A. Hazelwood, chairman of the commission. Wisconsin has 63,000 miles of public highway. State aid has been offered 3 years. In 1914 \$4,000,000 was spent in the construction of 1,500 miles of road, 700 bridges and 1,200 culverts. The total construction under state aid is: Concrete road, 200 miles; shale road, 100 miles; stone macadam, 900 miles; gravel macadam, 800 miles; dirt road, 1,200 miles. The total investment in good roads of the permanent type is \$8,000,000 in 3 years.

**Many Penn Farmers Own Cars**—Seven per cent of the farmers of Pennsylvania own motor cars, according to the figures compiled by L. H. Wible, chief of statistics of the Pennsylvania department of agriculture, from reports made to him from every county in the state. It is estimated by him that at least 15,000 cars are owned on farms and they are employed not only for getting about to make purchases and for pleasure, to go to church and meetings, but for marketing and hauling purposes. It is his belief that this year will see a big increase in the number of cars owned by farmers, who are getting good prices now and for whose use many makes of cars are being manufactured. On the other hand the condition of horses and livestock is reported to be generally under the average, although some western counties show slight gains. This situation is declared to be due to the poor pasture during the fall months, the scarcity and bad condition of the water and the severely cold weather

that has continued since the housing of the livestock for the winter. For the past several months hundreds of horses have been shipped to Europe.

**License Record is Broken**—Figures compiled by Secretary of State Thomas W. Miller of Delaware show that all records for the issuing of motor car licenses were broken in January. The total number issued in that month was 2,476, as compared with 1,750 in January, 1914. The receipts from motor vehicle registrations amounted to \$25,200, as compared with about \$19,000 in January of last year. During all of last year the total number of registrations was 3,050.

**Motorists Want Good Roads Day**—The Automobile Club of Philadelphia has addressed a communication to Governor Brunsbaugh requesting that he designate a day during the coming spring to be specially observed throughout Pennsylvania as good roads day, on which date every citizen would be requested to contribute his share toward improving the roads throughout the commonwealth. Recently the governor motored from Harrisburg to his home in Germantown in order to more fully acquaint himself as to the present condition of the roads.

**Colorado Prospects**—Five thousand more motor cars for Weld county, Colorado, in 1915, is the mark set by the dealers of Greeley, the county seat. There are now 15,000 cars in the county. The move for this one-third increase in sales this year has been taken up enthusiastically by the Greeley Motor Club and citizens in general. Salesmen making that territory report business conditions exceptionally good in general and predict a heavy trade along motor car lines this year.

**To Render Aid on Road**—The Good Samaritan Help League of Motorists has been formed in New York with the following officers: Dr. G. A. Englert, president; P. J. Knauss, vice-president, and R. A. Effenger, secretary and treasurer. The difficulty experienced by motorists in obtaining help or assistance on the road, when in trouble, prompted the formation of the league, the object of which is to "help others as you yourself would like to be helped." The league is open to all motorists. No dues are charged those joining the league; only an entrance fee of 50 cents, which makes one a life member and entitles him to an official signal banner and membership card. Members will display the signal when in need of assistance of any kind, and passing motorists will see the banner and render what help they can.

**Little Change in Motor Law**—The usual grist of freak legislation affecting motor cars is being introduced in the Wisconsin legislature at this time, but it is expected that few changes will be made in the present model state motor code, and those which will be made are to meet changed conditions. The present code was enacted in 1913 and has been widely copied. Some fear is expressed that the legislature will adopt a scheme of licensing based on weight and horsepower instead of a flat fee of \$5 per year as at present. James T. Drought, president of the Wisconsin State Automobile Association, and framer of the present code, is writing amendments which give the state much wider police powers than now, this having been found necessary because of the inadequacy of the present county policing system under the jurisdiction of the sheriff.





# Among the Makers and Dealers



**SPENCER Leaves Autocar Co.**—Charles H. Spencer, for the past 6 years advertising manager of the Autocar Co., Ardmore, Pa., has severed his connection with that concern and will open an advertising service office in Philadelphia in the near future.

**Starter Maker Increases Capital Stock.**—The capital stock of the American Pattern Works, Detroit, Mich., has been increased from \$10,000 to \$50,000. Joseph F. Buhr has been elected president; William Blanck, vice-president and Edward Stephens, secretary. The concern manufactures the Gemmer-Detroit starter for Ford cars.

**Building Addition to Main Works.**—The Allis-Chalmers Mfg. Co., Milwaukee, is erecting a large addition at its main works in West Allis, Milwaukee county, to accommodate the transformer department, moved from the Bullock works in Norwood, Cincinnati, O., to make room for the recently established electric starter-lighting system department.

**Seeks Army Truck Contracts.**—Robert L. Morton, of the Morton Truck Tractor Co., Harrisburg, Pa., sailed recently on the liner Adriatic for London, where he will represent his company in securing contracts for the allied armies. Mr. Morton is an efficiency expert of the four-wheel drive, the product of the Morton company being this type of truck.

**Organizing New Accessory Company.**—G. N. Prentiss, inventor of Racine Wis., is organizing a \$25,000 corporation with the assistance of the Grand Rapids Merchants' & Manufacturers' Association to manufacture a line of metal specialties, including a compact stove for motorists; gasoline and oil gauges; auxiliary seats and a number of light farm implements.

**Battery Company Equipping Plant.**—The Kentucky Revive Battery Co., which manufactures what is said to be a rechargeable dry storage battery, is now equipping its factory in the large building at Ninth and Jefferson street, Louisville, Ky., for a daily capacity of batteries valued at \$1,000.

**Columbiana Tire Plant Sold.**—The plant of the Columbiana Rubber Co. of East Liverpool, O., has been sold to a syndicate of capitalists from Mansfield, O., at a price which has not been made public. The appraised value of the plant is \$85,000 and has a capacity of 400 motor car tires daily. The plant will resume operations in a few weeks.

**Discuss Trucks and Battery Jars.**—"Installing the Initial Truck" and "The Construction of Hard Rubber Battery Jars" were the two subjects discussed at the regular monthly meeting of the New York section of the Electric Vehicle Association of America, held last week in the auditorium of the Consolidated Gas Co. building. Day Baker, General Vehicle Co., Boston, Mass., delivered the paper on the first subject and B. P. L'Hommiedieu and H. Weida, both of the India Rubber Co., New Brunswick, N. J., spoke on the second subject, using several types of jars for demonstration purposes.

**Close Option on Blair Truck Company.**—Cincinnati interests, represented by George F. Osler, have closed an option for the financing and full development of the Blair Motor Truck Co., Newark, O. The truck, which has been perfected by Frank M. Blair, is being manufactured in small quantities at the Newark plant, but lack of capital is one of the drawbacks to development. The capital stock of the company has been increased from \$100,000 to \$225,000. The new

truck is electrically driven from gasoline power and has direct transmission through a worm gear. Inquiries have been received from New York and Philadelphia for about 200 of the trucks for motor buses.

**Board is Re-elected President.**—At their annual meeting, the stockholders of the Kentucky Wagon Mfg. Co., maker of the Urban and Old Hickory trucks, re-elected R. V. Board as president and continued the present board of directors without change.

**Constructing New Trailer Works.**—The Troy Wagon Works Co. of Troy, O., has commenced building a new motor truck trailer works which will cover 16,800 square feet of ground and will enable the firm to turn out more than sixty trailers weekly.

**Rim Demand Exceeds Normal.**—The Standard Welding Co., of Cleveland, has added 79 men to the working force in its rim department. Officials of the company report that manufacturers are ordering up to specifications. The added working force will bring to more than normal the production of rims by this company.

**Spring Company to Build Factory.**—The Babcock Automobile Spring Co., which was established in Milwaukee at 187 Oneida street about 18 months ago, is about to erect a plant in Milwaukee for the manufacture of its products. A contract has been awarded for the erection of a factory building on Milwaukee street, near Chicago street. It will be of solid brick construction.

**Starts Output of Le Roi Motors.**—The plant of the Milwaukee Machine Tool Co., Sixtieth avenue and Mitchell street, West Allis, which passed into the possession of the Kearney & Trecker Co., milling machines, several years ago, is now devoting practically its entire attention to the production of gasoline motors for light cars. More than 2½ years' of experimentation was undergone before the

motors were placed on the market. The trade name of "Le Roi" has been adopted for the engine, which is built in two sizes, 2½ by 4 inches and 3½ by 4½ inches bore and stroke.

**Jeffery 1915 Product Over Half Sold.**—With the advent of March, generally accepted as the opening of the spring selling season, the Thomas B. Jeffery Co. of Kenosha, Wis., already has sold and delivered more than half of the cars that it will build for 1915, according to Sales Manager E. S. Jordan.

**Pullman Plant Under Full Steam.**—The plant of the Pullman Motor Car Co., York, Pa., is being operated to its fullest capacity. The increased business is due to the orders for the Pullman Junior, the new model placed on the market this season. Daily shipments of cars are being made from the factory.

**Hartford Show Financial Success.**—A dividend of 64½ per cent has been declared by the Hartford Automobile Dealers' Association as a result of the recent motor car exhibition at the state armory. The management announces that the show just ended is the most successful that has ever been held in the city. The First Infantry, under whose auspices the show was given, shared in the proceeds.

**Clare with Chase Company.**—W. A. Clare, formerly in the research department of the Burroughs Adding Machine Co., and later with the Service Recorder Co. in charge of motor transportation problems, has joined the ranks of the Chase Motor Truck Co., Syracuse, N. Y., and will have charge of the dealers' aid and research department, which has been established by H. T. Boulden, who recently has become general sales manager of the Chase company.

**Barbour Ohio Electric President.**—Several changes among the officials of the Ohio Electric Car Co., Toledo, O., were recently made. M. V. Barbour is now the president of the company. He is a member of the Barbour & Star Lumber Co. C. M. Foster, has been appointed vice-president and general manager. Herman H. Brand is secretary-treasurer. The board of directors is composed of the officers and J. F. Vogel, of the Gendron Wheel Co.; A. E. Baker, of Baker Bros.; Rathbun Fuller, attorney and H. E. Marvin, of Wading, Kinnan & Marvin, attorneys.

**Gray & Davis Sales Total \$4,000,000.**—The gross sales of Gray & Davis, for 1914, are understood to be \$4,000,000, a new high water mark. The first 6 months registered sales of \$2,500,000 and the final half year tapering off normally to around \$1,500,000. The earnings for the full year were in excess of \$300,000, over two-thirds of which was contributed in the 6 months prior to June 30. At this rate, earnings upon the preferred stock are equivalent to about six times the dividend requirements, the outstanding preferred having increased from \$500,000 to \$750,000 during the year.

**Forced to Increase Working Force.**—The Hans Motor Equipment Co. of La Crosse, Wis., which was involved in financial difficulties some time ago, has now been re-established on a sound basis and is operating at the largest capacity yet attained by the plant. During last week about 25 additional workmen were employed and if the present rush of orders is maintained, the force will be still further increased. The concern manufactures gasoline and oil gauges, pumps and other small equipment which is used by many of the leading car builders of the country.

## Coming Motor Events

### SHOWS AND CONVENTIONS

March—Show, Shelbyville, Ind.  
March 6-13—Show, Boston, Mass.  
March 8-13—Show, Des Moines, Ia.  
March 11-13—Show, Kenosha, Wis.  
March 13-20—Show, Harrisburg, Pa.  
March 17-20—Show, Elgin, Ill.  
March 25-27—Show, Mason City Ia.

### CONTESTS

... March 6—Vanderbilt cup race, San Francisco, Cal.  
\* March 17—Road race, Venice, Cal.  
\* March 20—Road race, Tucson, Ariz.  
\* April 20-22—Road races, Oklahoma City, Okla.  
\* May 29—500-mile speedway race, Indianapolis, Ind.  
June 9—200-mile dirt track race, Galesburg, Ill.  
\* June 19—500-mile speedway race, Chicago.  
\* July 3—300-mile race, Sioux City, Ia.  
\* July 4-5—Speedway races, Tacoma, Wash.  
\* July 4—Road race, Visalia, Cal.  
\* July 5—Speedway races, Omaha, Neb.  
July 9—100-mile dirt track race, Burlington, Ia.  
July 31—Road race, Denver, Colo.  
August 14—Dirt track races, Janesville, Wis.  
August 20-21—Elgin road races, Elgin, Ill.  
September 6—Speedway races, Providence, R. I.  
September 6—100-mile dirt track race, Kalamazoo, Mich.

Sanctioned by A. A. A.



# Brief Business Announcements



**MOSINEE, Wis.**—Al. H. Kernian and Alex Tigges have established an electrical store and general electrical repair shop in the Kanter building.

**Fall River, Wis.**—A. E. Knaak, who recently was appointed agent for the Case in Fall River and vicinity, is establishing a garage and service station.

**St. Louis, Mo.**—The Weber Implement and Automobile Co. has taken over the agency in the St. Louis district for the Disco electric starter for Ford cars.

**Mayville, Wis.**—The Pioneer Automobile Co. has been organized here by Orville Hurlbert, Frank Bauer and Alvin Butter and established a garage on North Main street. The new concern holds the Dodge agency.

**Green Lake, Wis.**—Glenn A. Hill of Ripon, Wis., has taken the agency for the Ford and Overland in Green Lake county and has established a garage and salesroom here.

**Ripon, Wis.**—J. H. Battell, proprietor of the Ripon Auto Co., has made an installation of welding and cutting equipment and is otherwise enlarging the facilities of his garage and repair shop.

**Tomah, Wis.**—C. A. and R. S. Murray of Tomah, Wis., have purchased the business and property of the Tomah Iron Works and Garage and are making extensive changes, additions and improvements, particularly in

the mechanical department, which will be in charge of George Cousino, until now with the Totten Motor Co. of Rock Island, Ill. The shop room will be more than doubled.

**Platteville, Wis.**—The Henning & Geasland Sheet Metal Works has been established at Platteville, Wis., and taken quarters in the Oettker building.

**Colfax, Wis.**—Paul & Rosenberg is making plans for the erection of a garage at Pine and River streets, to be 60 feet square and of reinforced concrete construction. Ole G. Kinney will start construction work on a new garage about March 15, giving Colfax two modern buildings.

**Detroit, Mich.**—The Bunce-Crane Co. has been organized by E. M. Bunce and Charles S. Crane, with headquarters at 851 Woodward avenue, to handle the Enger cars, made by the Enger Motor Co., Cincinnati, O. The local concern has all of Michigan for its territory and will appoint agents and sub-agents in all important localities.

**Harrisburg, Pa.**—The Capital City Motor Dealers' Association was organized at a recent meeting of local dealers. It is the purpose of the new organization to include all dealers within a radius of 50 miles, the aim being to get into the association dealers from Lancaster, Reading, Lebanon and a number of other cities. The officers of the

association are: President, George Dechant; vice-president, E. W. Shank; secretary-treasurer, R. C. Barrett.

**Detroit, Mich.**—The Bunce-Cuson Co., which handled the Krit cars, has been dissolved. Mr. Cuson is now with the service department of the bankrupt Krit Motor Car Co., and Mr. Bunce is handling the Enger.

**San Francisco, Cal.**—The Costello-Lang Co., Pacific coast distributor of the Hardman tires, has opened for business and also has received the Pacific Coast agency for the Cross Grain tube and the Falls tire.

**Prairie du Chien, Wis.**—Louis Bushing, Waterloo, Ia., will establish a garage here on March 15. He has leased half of the Dousman block and will make a feature of repair work. In addition, Mr. Bushing will represent the Franklin in a number of western Wisconsin counties.

**Detroit, Mich.**—The Packard Motor Car Co. has decided to open a branch in this city, and beginning March 1 this branch will be located temporarily at the main plant of the company, on East Grand boulevard. As soon as a suitable location is found in another part of the city, a branch salesroom, garage and service station will be erected.

**Milwaukee, Wis.**—The Standard Racine Rubber Co. of Milwaukee, state agent for Racine tires, which recently took new and larger quarters in the new Oxford building

## Recent Agencies Appointed by Motor Car Manufacturers

### PASSENGER CARS

Town	Agent	Make	Town	Agent	Make
Ashtabula, O.	Brockway & Callender	Saxon	Callaway, Neb.	Henry Ridder	Metz
Aurora, Ind.	Caufield-Lunkeyer	Buick	Corydon, Ind.	J. W. Grable	Studebaker
Ashtabula Harbor, O.	G. H. Smith	Pilot	Carroll, Ia.	Carroll Motor Co.	Cartercar
Adel, Ia.	Alkire Auto Co.	Moon	Canajoharie, N. Y.	W. J. Roer	Pilot
Almira, Wash.	J. G. Callanan	Dodge	Corpus Christi, Tex.	W. A. Wakefield	Pilot
Ashland, Neb.	W. A. Fowler	Metz	Danville, O.	Ross, Nyhard & White	Saxon
Alliance, Neb.	H. J. Ellis	Haynes	Dover, N. J.	James Gardner & Son	Saxon
Albion, Neb.	J. H. Moore	Haynes	Denver, Colo.	The Colorado Motor Car Co.	Saxon
Avoca, Ia.	Pratt & Jensen	Moline-Knight	Danville, Ky.	Elmer Day	Buick
Blossburg, Pa.	H. H. Roberts Trading Co.	Saxon	Decorah, Ia.	Kjome & Lynne	Moon
Bridgeport, Ill.	Home Garage	Saxon	Duckers Station, Ky.	J. D. Smith	Pilot
Bayport, L. I.	Bayport Garage	Saxon	Deer Park, Wash.	S. H. Groshong	Overland
Bowling Green, Ky.	Bowling Green Garage	Buick	Delavan, Wis.	W. H. Stewart & Son	Reo
Borden, Ind.	Albert McKinley	Buick	Douglas, Wyo.	Rice Hardware & Motor Co.	Moon
Blairstown, N. J.	Messler & Smith	Saxon	Dover, N. H.	G. O. Atherne	Pullman
Belle Mead, N. J.	R. I. Cruiser	Saxon	Dixon, Ky.	R. L. Jackson	Hudson
Bridgeport, Conn.	Harry M. Ford	Saxon	Dawson Springs, Ky.	T. E. Lutz	Hudson
Booneville, Ind.	W. P. Zint	Buick	Ehreno, Okla.	H. Townsend	Pilot
Bondurant, Ia.	Bondurant Garage	Moon	Effingham, Ill.	Curry Motor Car Co.	Saxon
Bangor, Me.	Utterback-Gleason Co.	King	Evansville, Ind.	Protsman & O'Neal	Buick
Boston, Mass.	Johnson-Hayes Co.	Pilot	Elizabethtown, Ky.	A. H. Douglas	Studebaker
Berlin, Wis.	Leachelt & Schwellkle	Dodge	Frankfort, Ky.	Frankfort Motor Car Co.	Hudson
Beatrice, Neb.	Kline Merc. Co.	Moon	Freeport, Ill.	Freeport Motor Mart	Saxon
Boston, Mass.	H. S. Waite Co.	Grant	Fall River, Wis.	A. E. Knaak	Case
Bancroft, Neb.	T. E. Tighe	Metz	Fremont, Neb.	Zapp Auto Co.	Grant
Belleville, Ill.	G. W. Sahlender	Moon	Fulton, Ky.	J. E. Browder	Buick
Bancroft, Neb.	H. J. Munderloh	Metz	Ferndale, N. Y.	M. M. Schulz	Pilot
Bristol, Conn.	L. B. Snyder	Moon	Glasgow, Ky.	Bradford Bros.	Buick
Croswell, Mich.	F. A. Moore	Saxon	Glasgow, Ky.	Glasgow Motor Car Co.	Studebaker
Central City, Ky.	Barnes Auto Co.	Hudson	Green Lake, Wis.	Glenn A. Hill	Ford
Central City, Ky.	Barnes Auto Co.	Buick	Green Lake, Wis.	Glenn A. Hill	Overland
Charlotte, N. C.	Barrington Garage Co.	Saxon	Glens Falls, N. Y.	D. J. Finn	Moon
Califon, N. J.	Lyons & Hoffman	Saxon	Barbourville, Ky.	A. D. Smith	Buick
Catskill, N. Y.	Amos Post Garage	Saxon	Holyrood, Kan.	G. L. Baker	Moon
Canton, O.	Al Shem	Saxon	Humphrey, Neb.	H. J. Breunig	Grant
Campbellsville, Ky.	Buchanan-Lyons Co.	Hudson	Hastings, Neb.	W. J. Swanson	Haynes
Campbellsburg, Ky.	W. V. Campbell	Buick	Iowa Falls, Ia.	Babcock Auto Co.	Moon
Coatesville, Pa.	Young Brothers	Pilot	Ironton, O.	Jones' Automobile Livery	Saxon
Carlisle, Ky.	Ratliff, Ledford & Martin	Buick	Jersey Shore, Pa.	R. M. Sallada	Pilot
Cleveland, O.	Dunham Motor Car Co.	Moon	Jeffersonville, Ind.	G. W. Patton	Mitchell
Cherokee, Neb.	S. Swanson	Kissel Kar	Kevil, Ky.	Viles & Halley	Buick
Clarinda, Ia.	J. P. Brown	Metz	Keosauqua, Ia.	E. W. Peacock	Moon
Carroll, Ia.	Carroll Motor Co.	Enger	Little Falls, N. Y.	G. W. Norris	Moon



at Jefferson and Onelda streets. is making one of the largest installations of steam vulcanizing equipment in Milwaukee. The equipment includes six tanks of 280 gallons' capacity each.

Detroit, Mich.—Elmer W. Brown & Co., recently organized to handle supplies, is now

located at 967 Woodward avenue. The company has been appointed distributor for the Diamond tires. F. W. Brown is president; O. H. Dawson, vice-president and C. Rasmussen, secretary-treasurer.

Detroit, Mich.—The local quarters of the Lewis Spring and Axle Co., at 1003 Wood-

ward avenue, will either be enlarged and made more suitable as salesrooms or the headquarters will be located in another building. The company recently started to manufacture an eight-cylinder car, the Holler, and the first demonstrators are to be sent to agents early in March.

## Recent Incorporations

Albany, N. Y.—Williams Taxicab Co., capital stock \$1,200; incorporators, G. D. Williams, J. F. Disken, F. Graguglia, A. Medeo.  
Boston, Mass.—Vedo Tire Infactor Co., capital stock \$30,000; incorporators, A. L. Nickerson, W. W. Clarke, W. R. Dorf.  
Brooklyn, N. Y.—East New York Garage, capital stock, \$1,000; to conduct a general garage business; incorporators, B. M. Foreman, C. A. Cornelius, H. K. Cornelius.  
Buffalo, N. Y.—Motor Express & Sales Corp., capital stock \$800,000; incorporators, J. G. Berner, I. Campbell, J. U. Mooney.  
Buffalo, N. Y.—Simco Motor Sales Co., capital stock \$10,000; to deal in motor cars and accessories; incorporators, D. E. Knowlton, R. A. Kellogg, P. A. Sullivan.  
Cincinnati, O.—Cincinnati Motor Coach Co., capital stock \$10,000; incorporators, C. B. Kearn, L. Bauer, A. J. Kaufhold, L. H. Bachman, H. Abbott, C. J. Kelzer.  
Deep River, Conn.—A. R. Jones Garage Co., capital stock \$15,000; incorporators, J. J. Jones, A. R. Jones, F. H. Rogers.  
Dover, Del.—Mussian Tire Corp., capital stock \$3,000,000; to deal in motor cars; incorporators, S. B. Howard, H. O. Coughlin.  
Dover, Del.—Rapid Seal Distributing Co., capital stock \$100,000; to manufacture puncture heading liquids for tires; incorporators, J. A. Vogel, H. R. Loose, G. W. Collins.  
East Orange, N. J.—Chevrolet Motor Co., capital stock \$300,000; service station; incorporators, W. C. Durant, W. W. Murphy.  
Indianapolis, Ind.—States Motor Car Co., capital stock \$20,000; to manufacture motor vehicles and accessories; incorporators, R. C. Cope, W. B. Smith, W. Myers.  
Johnstown, Pa.—Lincoln Automobile Co., capital stock \$10,000; incorporators, J. T. Barnes, H. E. Stahl, W. J. Phillips, R. L. Richardson.  
Manhattan Boro, N. Y.—American Motor Parts Co., capital stock \$50,000; to manufacture motor cars; incorporators, F. R. Hansell, G. H. B. Martin, S. C. Seymour.  
Manhattan Boro, N. Y.—Irving Stables Liv-  
ery, capital stock \$10,000; garage and transfer

business; incorporators, R. B. Reed, E. L. Cheney, R. R. Billington.  
Manhattan Boro, N. Y.—Joseph J. Kittel, capital stock \$10,000; motor car business; incorporators, M. Kittel, J. J. Kittel, R. J. Kittel.  
Manhattan Boro, N. Y.—Mussum Tire Co., capital stock \$3,000,000; to manufacture tires; incorporators, S. B. Howard, H. O. Coughlin, J. M. Satterfield.  
New Rochelle, N. Y.—Westchester Auto Sales Co., capital stock \$10,000; incorporators, F. J. Heldsworth, J. L. Freeborn, E. M. Holden.  
Mt. Vernon, N. Y.—Vernon Heights Garage, capital stock \$3,000; incorporators, E. E. Ultecht, A. A. Ultecht, Wm. J. Terwilliger.  
Nacogdoches, Tex.—Schmidt Auto Sales Co., capital stock \$15,000; incorporators, H. J. Schmidt, Albert Bright, John Schmidt.  
New York—Amsterdam Supply Co., capital stock \$500; incorporators, H. Wheeler Chatfield, M. A. Bach, G. M. Mills.  
New York—Aviauto Mfg. Co., capital stock \$5,000; to manufacture motor cars, aeroplanes and radiators; incorporators, B. A. Law, M. Baier, S. F. Miller.  
New York—The Dan-Mar Corp., capital stock \$25,000; to manufacture tires; incorporators, C. Solomon, D. Greenbaum, M. Lewis.  
New York—Seubert Bearing Co., capital stock \$1,000,000; to manufacture ball bearings; incorporators, L. H. Seubert, C. A. Whitney, Wm. E. Lewther.

New York—Greeley Square Garage Co., capital stock \$2,000; incorporators, E. B. McNally, J. Topf, J. T. Ryan.  
New York—Parisano Aerial Navigation Co. of America, capital stock \$100,000; incorporators, M. A. Parisano, B. Simon, J. Simon.  
Paterson, N. J.—W. H. Richardson Co., capital stock \$50,000; to manufacture motor vehicles; incorporators, W. H. Richardson, C. H. Richardson, B. J. Burke.  
Portland, Me.—Triplex Inner Tube Co., capital stock \$200,000; to manufacture and deal in inner tubes; incorporators, C. H. Mitchell, H. A. Paul.  
Rome, N. Y.—Rome & Northern Auto-Bus Co., capital stock \$2,000; incorporators, G. Jones, A. S. Noonan, Wm. C. Perry.  
Syracuse, N. Y.—Bartlett & Smith Motor Co., capital stock \$10,000; incorporators, G. W. Bartlett, E. C. Bartlett, G. W. Stickney.  
Trenton, N. J.—Auto Salvage & Sales Co., capital stock \$50,000; general motor car business; incorporators, R. O. East, H. P. Clymer, T. C. Mappes.  
Trenton, N. J.—Automobile Tire Cooler Co., capital stock \$50,000; incorporators, D. Hall, A. Lindsay, C. C. Leonard.  
Trenton, N. J.—Flexible Fraction Motor Truck Co., capital stock \$50,000; to manufacture motor trucks; incorporators, F. A. Conkling, H. W. Brookes, W. J. Watson.  
Trenton, N. J.—Globe Rubber Tire Mfg. Co., capital stock \$50,000; to manufacture tires; incorporators, W. H. Linburg, J. S. Broughton, H. L. Joyce.  
Trenton, N. J.—H & R Machine & Garage Co., capital stock \$5,000; incorporators, I. H. Riopel, T. B. Hopper, E. W. Riopel.  
White Plains, N. Y.—Capital Transfer & Taxi-Cab Co., capital stock \$5,000; incorporators, G. L. O'Brien, E. A. O'Brien, Wm. A. O'Brien.  
Wilmington, Del.—Loadometer Co., capital stock \$150,000; incorporators, G. W. Stillman, F. D. Buck, M. L. Harty.

## Recent Agencies Appointed by Motor Car Manufacturers—Continued

### PASSENGER CARS

Town	Agent	Make	Town	Agent	Make
Louisville, Neb.	A. R. Standar	Cartercar	Providence, R. I.	Saxon Motor Vehicle Co.	Saxon
Lexington, Mo.	E. F. Cox	Moon	Paducah, Ky.	Kentucky Auto Machine Co.	Buick
Lawrenceburg, Ky.	Strange, Hawkins & Witherspoon	Buick	Palmer, Neb.	John Kruse	Haynes
Lawrenceburg, Ky.	Vanarsdale-Cole-Marrs Vehicle Co.	Hudson	Portland, Me.	Franklin Motor Car Co.	Scripps-Booth
Livingston Manor, N. Y.	Manion's Garage	Saxon	Plainview, Tex.	W. C. Wright	Pilot
Lebanon, Ky.	T. M. Estes	Studebaker	Paxton, Neb.	F. L. Burt	Cartercar
Lebanon, Ky.	W. B. Samuels	Buick	Pittsfield, Mass.	F. A. Minkler	Ford
Leon, Ia.	Carl Snyder	Metz	Pittsfield, Mass.	Herrick & Johnson	Saxon
Lynn, Mass.	W. S. Russell Co.	Haynes	Plymouth, Neb.	A. W. Welch	Metz
Lebanon, Ky.	Lewis & Drye	Hudson	Prairie du Chien, Wis.	Louis Bushing	Franklin
Louisville, Ky.	Argo Motor Agency	Argo	Rock Island, Ill.	John Dee	Saxon
Morristown, N. J.	W. H. Dutton Co.	Saxon	Rockland, Mass.	Charles H. Hubbard & Sons Co.	Trumbull
Milford, N. H.	Souhegan Automobile Co.	Ford	Richmond, Ind.	Irwin Reed & Son	Saxon
Mt. Sterling, Ky.	Stone & Flora	Buick	Rialto, Cal.	Ben Buxton	Moon
Miami, Fla.	J. K. Dorn	Saxon	Rulo, Neb.	F. Winterbottom	Metz
Montreal, Que., Can.	Sevigny & Lalonde	Moon	Springfield, Ky.	McClure & Mays	Studebaker
Monon, Ind.	H. B. Tull	Pilot	Somerset, Ky.	Dr. J. M. Owens	Buick
Milton, Ky.	D. T. Volers	Buick	Sturgis, Ky.	J. O. McCauley	Buick
Manning, Ia.	Herman Gotch	Moline-Knight	Seward, Neb.	H. A. Hershberger	Metz
Modale, Ia.	Southside Garage	Metz	Salem, Ind.	G. W. Patton	Mitchell
Middleboro, Ky.	Brashear & Brummett	Buick	Santa Fe, N. M.	S. Nathan	Pilot
Mayville, Wis.	Pioneer Auto Co.	Dodge	Shelton, Conn.	H. L. Stilphen	Pilot
Manchester, N. H.	Eugene Reed	Stutz	Shelbyville, Ky.	E. R. Wilson	Studebaker
Northport, N. Y.	J. E. Merrihew	Saxon	Steptoe, Wash.	G. M. Trowbridge	Maxwell
Newport, N. H.	Kidder Garage Co.	Ford	Shelbyville, Ky.	Turner Wilkinson	Buick
New Haven, Conn.	Trench & Farr	Saxon	San Pedro, Cal.	E. Amar	Moon
New Bedford, Mass.	S. T. Lee	Saxon	Stanton, Neb.	G. Lund	Grant
N. Bloomfield, O.	B. A. Russell	Saxon	Stanton, Neb.	J. R. Stucker	Moline-Knight
Norfolk, Va.	Norfolk Garage & Machine Co.	Moon	Tuscola, Ill.	F. Wilson	Pilot
New Philadelphia, O.	S. S. Urfer	Pilot	Twin Falls, Idaho	Smith & Spafford	Moon
Norfolk, Neb.	Wilson Bull Tractor Co.	Metz	Terre Haute, Ind.	M. A. Steele	Saxon
Merna, Neb.	Charles Hipsley	Cartercar	Utica, N. Y.	Utica Mitchell Motor Co.	Saxon
Morganfield, Ky.	H. C. Davis	Buick	Villisca, Ia.	H. C. Evans	Haynes
New Bedford, Pa.	F. X. Turgeon	Pilot	Vevay, Ind.	Conn & Mahan	Buick
Norfolk, Neb.	Paswalk Co.	Auburn	Van Wert, O.	W. G. Campbell	Saxon
Owensboro, Ky.	Central Motors Co.	Hudson	Wellsburg, Ia.	D. J. Riekana	Moon
Owensboro, Ky.	Barnes Auto Co.	Buick	Withrow, Wash.	J. E. Andrews	Overland
Ovid, Mich.	A. Squier	Saxon	Worcester, Mass.	N. E. Motor & Supply Co.	Saxon
Ord, Neb.	Frank Beran	Grant	Waltham, Mass.	Metz Automobile Co.	Metz
Plymouth, Pa.	S. C. Hartman	Saxon	Winchester, Ky.	Winchester Garage Co.	Buick
Princeton, Ind.	A. A. Reinhart & Son	Saxon	Williamstown, Ky.	Williamstown Motor Car Co.	Buick
Princeton, Ind.	A. A. Reinhart & Son	Saxon	Watertown, N. Y.	W. D. Nellis	Saxon
Princeton, Ind.	A. A. Reinhart & Son	Saxon	Washburn, Me.	Bagley & Cheney	Saxon

# The Motor Car Repair Shop

THE successful and money-making garage of today is the one which is equipped to handle any repair work that comes its way. Whether it be a big job of vulcanizing a new tread to a tire or doing some machine work, the repair shop that is in the business on a paying basis is in shape to handle the work without hesitation. The car owner appreciates this service and unhesitatingly leaves his machine in the hands of the shop. If the garage had no equipment for special and out-of-the-ordinary repairs, the owner would feel somewhat uneasy in entrusting his car to it, not only because of the improper facilities for the work, but also because he knows that he would be charged more for the job. This is natural enough, for if the garage has to send the work out to a machine shop or other plant equipped for the work in hand, there is another profit to be considered in fixing the charge to the car owner.

Fig. 2 gives a very good example of a small machine shop in a garage in a metropolitan district. Along the windows is arranged a substantial work bench, where, with sufficient light, back of the long bench are arranged the three machine tools which are sufficient for any garage. In the foreground is a Potter and Johnson shaper of standard form. Next to it is located the lathe, which is the most necessary tool of all. Then there is an emery wheel for grinding and for sharpening tools.

Power for driving these tools is furnished by a small electric motor at the far end of the room, and it is so arranged that the starting box is convenient to the men. Therefore, the machinery is not running all the time, with resulting economy of current consumption.

In one end of the partitioned-off machine shop department are a series of shelves and

## Equipment for Repair Shop

bins, as shown in Fig. 1, for the storing of supplies used. Each cutter and tool required by the machine tools is kept in an indexed compartment here, so that it is a simple matter to find what is wanted. It is a strict rule of the garage—and the foreman sees that it is lived up to—that each tool is returned to its place after the workman has finished with it.

In this shop, with the equipment mentioned, it is easy to see that almost any kind of a machine job can be performed. There are often times when a small part is broken that much time would be saved by simply making a new one in the shop rather than waiting to order it from the factory and paying express charges as well as the cost. This applies to such things as nuts with special threads, small collars or distance pieces, or any of a number of things which do not require very accurate machine working, and which can readily be turned out on a lathe.

Add to such stationary equipment several portable electric drills and a portable compressor outfit with an electric motor drive and the garage is fitted with as complete a mechanical array, for tackling any job, as could be desired. This, of course, takes for granted that the usual list of hand tools is available. Where extensive repairing and overhauling, such as that often encountered, is to be carried on, a movable crane, which will lift out the motor or any other heavy unit, is very desirable. This may be put into service to raise the whole front end of the car or the rear end, if desired.

In the garage in which the illustrations were taken, a pit some 4 feet deep and 3 feet wide is employed for working under

the car. This allows the men to assume a nearly upright position.

Never construct a pit for underneath working which is less than 3 feet wide, nor shorter than 6 feet in length. The man cannot move around properly if his quarters are smaller than these dimensions. The sides and bottom of the pit should be properly cemented, for dampness and improper working conditions apply with just as much force here as anywhere else. A set of the ordinarily-required standard tools should be kept in a box in this pit. They should not be removed from it either. Much time can be wasted in getting in and out of the pit for the commonest kind of tools and supplies.

## Don't Paint the Inside of a Universal

From the maker of Spicer universal joints comes a useful tip which it would be well to remember when a car is being painted. It is a point which many would overlook. "We have noted that sometimes when painting the car, the painter covers all of the exposed surface of the universal. The result is that a portion of the spherical surface of the inside casing is painted, while the balance of the casing surface which is covered at the time by the outer casing is not painted. Furthermore, a ridge of paint is formed at the line of contact between the inside and outside casings. Thus the packing, which normally would be grease-tight and dust-proof, has to ride over this ridge of hard paint when the new or repainted car is put in commission until the paint is worn off, the result being that the packing is unnecessarily worn, and it is exceedingly difficult to keep the joint tight. We therefore suggest that the inside casing be left free of paint. This of course does not apply to the spherical part of the outside casing."

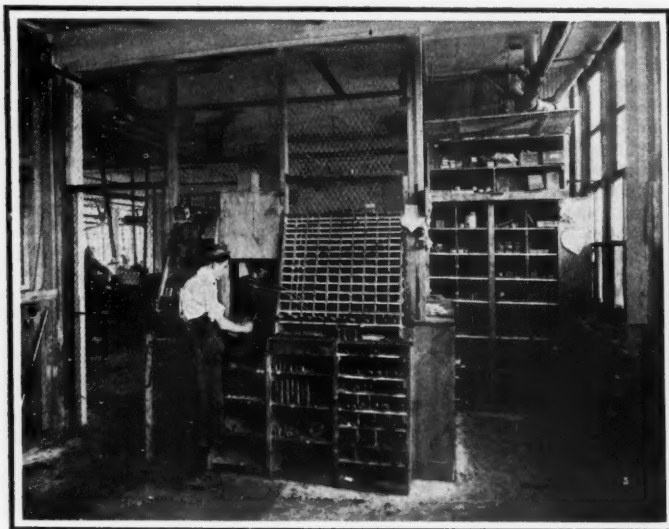


FIG. 1—HOW SUPPLIES ARE STORED IN AN UP-TO-DATE SHOP

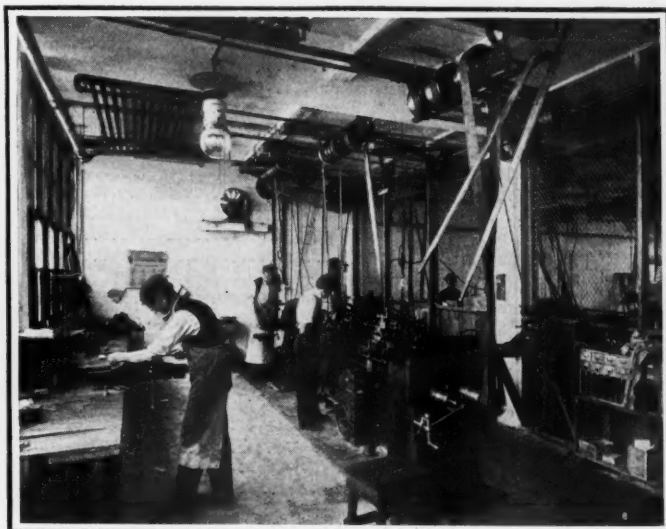


FIG. 2—INTERIOR OF A WELL-EQUIPPED REPAIR SHOP



# 6<sup>th</sup> Anniversary

MARCH 4, 1915-Inaugurated-MARCH 4, 1909



## Always on Top-Always Climbing

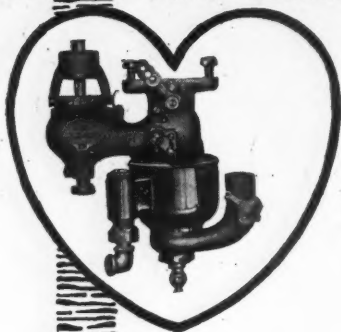
Emil Grossman M'f'g Co., Inc.

Bush Terminal, Model Factory No. 20  
BROOKLYN, New York City, N. Y., U. S. A.  
Chicago: 2615 Michigan Ave

When Writing to Advertisers, Please Mention Motor Age.

# SCHEBLER WINS

*The Heart of the Automobile*



The first American car to cross the wire in the Grand Prix race—a Stutz—was Schebler-equipped.

This SCHEBLER victory is all the more remarkable when it is considered that only five of the 30 cars which started the Grand Prix finished.

SCHEBLER has been a winner in every road race this year—has won more official road races in the last 10 years than any other American carburetor.

Nothing proves the EVERYDAY WORTH of a carburetor—the ability to stand up under most adverse service conditions—more certainly than road racing. SCHEBLER carburetors stand the gaff! Demand a SCHEBLER on your new car.

**Wheeler & Schebler**  
Indianapolis, Indiana



*When Writing to Advertisers, Please Mention Motor Age.*



# The Distinctive Stewart Six



## Announcement

I asked the general manager to tell me three of the principal selling points of "The Distinctive STEWART SIX." He said:

"Most cars you see on the street look alike. Lots of folks cannot tell one from another. There's a real demand for a distinctive car—a car that has some individuality. The "STEWART SIX" with its long, graceful, sloping hood—Renault type—is not only beautiful but distinctive.

"It's a big car, with a roomy 7-passenger body, 127" wheelbase, wide seats, big doors, nothing cramped or skimpy about it. It is long and rangy—low to the ground.

### Standard Parts of Recognized Quality

"In designing the STEWART SIX we did not try to meet a certain determined price. We set out to build an ideal automobile and we fixed the price afterward—\$1950. We put into the car the finest kind of parts—parts of the highest grade and the best reputation.

"Any automobile engineer will tell you there is nothing better than the Continental motor, Timken axles and bearings,

Brown-Lipe transmission, Gemmer steering gear, Fedders honeycomb radiator, Westinghouse starting, lighting and ignition. And we use all these in the STEWART SIX.

"Our body is of aluminum. Only three or four other American cars use aluminum bodies and they are high priced automobiles. The STEWART SIX is the most comfortable car I have ever ridden in. Its cantilever springs make the rear seat easier riding than the front seat of other cars.

### Note These Amazing Specifications

Genuine Continental Motor, 6 cylinder, 44 H. P.  
Westinghouse starting, lighting and ignition.  
Stewart suction feed system.  
Brown-Lipe transmission with Timken bearings.  
Dry Plate Clutch.  
Three-point suspension for power plant.  
Timken front and rear axles.  
Spiral bevel gears in rear axle.  
Timken roller bearings throughout.  
Gemmer steering gear.  
Spicer tubular drive shaft.  
Cantilever springs in rear.  
Firestone rims and tires, 34x4½ 127" wheelbase, 56" tread.  
Fedders honeycomb radiator in cowl.  
Stromberg carburetor.  
Roomy aluminum body.  
Deep and luxurious upholstery.  
Disappearing auxiliary seats.  
Low to the ground.  
Beautiful sloping hood.  
All mechanical parts easily accessible and quickly removable.  
Beautifully painted and finished.  
All details nicely worked out.  
Kellogg Power Tire Pump.  
Electric horn.

### Note These Many Conveniences

"Every convenience that the experienced motorist demands is found in the STEWART SIX—control instruments neatly grouped on the cowl board, gear shift and brake levers in center, well forward out of the way; left-hand steer; electric horn; Stewart speedometer geared off drive shaft; concealed heater in tonneau for winter weather; electric inspection lamp with 10 feet of cord; Kellogg tire pump; Firestone demountable rims (one extra); tool kit in front door pocket; one-man top; sliding storm curtains.

"Remember that the STEWART SIX is built by a strong organization of automobile men, who have had years of experience in building both pleasure and commercial cars."

### Write Today

Our dealership proposition is exceptionally attractive. We want live dealers for the "STEWART SIX" everywhere.

## Stewart Delivery Trucks

Are in use in 85 lines of business in 123 cities in the United States, Canada and South America. We do not know of one dissatisfied owner. We are greatly increasing our output for the year 1915.

**Stewart Motor Corporation**  
**Buffalo, N. Y.**

*Makers of Pleasure and Commercial Cars*

*Every  
Inch  
a Car.*



36-Four .....\$1,450  
42-Six .....\$1,650

## Choose Wisely

All the 1915 models are lined up for your inspection—which will be yours?

It must square with your sense of beauty, your standard of comfort, your conception of mechanical merit.

Take a long look at the KisselKar 36-Four and KisselKar 42-Six. Have you seen any cars more striking—more distinctly individual?

## Choose a KISSELKAR

It is not alone in looks that these KisselKars excel—it is in those qualities that make for comfort, convenience and—above all—ENDURANCE.

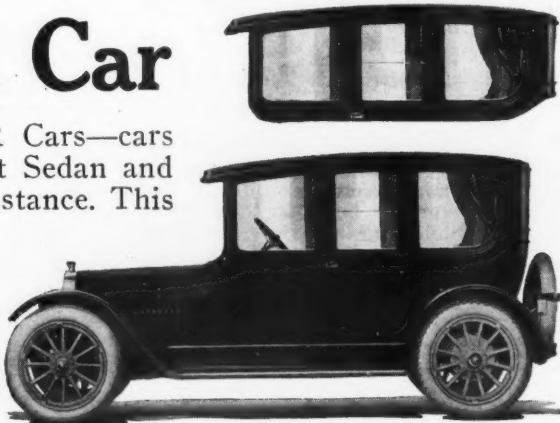
You will find no motor to equal a Kissel-built motor—none that so perfectly combines power and economy. You will find no chassis more accessible and simple, no equipment more modern and complete.

## The ALL-YEAR Car

These cars are—if you like—ALL-YEAR Cars—cars that you can quickly transform into a smart Sedan and back to a touring tonneau—without expert assistance. This feature is a Kissel idea—thought out and brought out by Kissel. It will be widely imitated—next fall.

The Detachable Sedan Top is but \$350.

Send for our new illustrated catalog and make it a point to try out a KisselKar at the earliest possible date to insure early delivery.

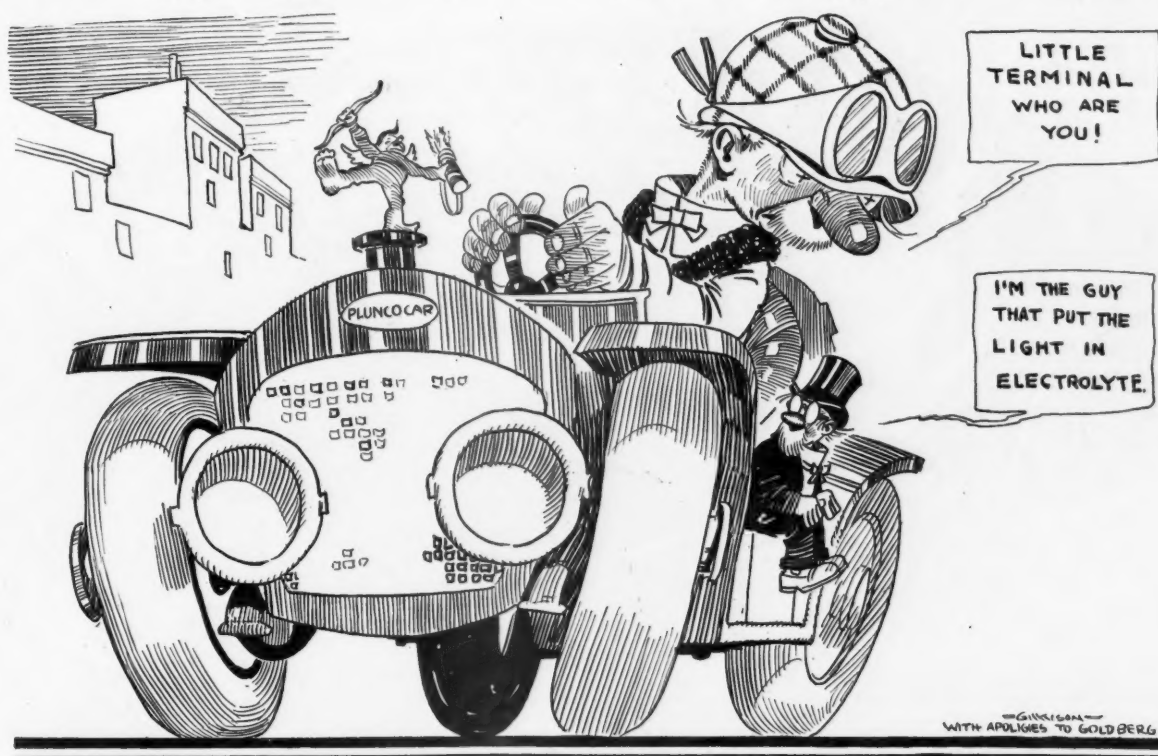


**KISSEL MOTOR CAR COMPANY,**

New York, Boston, Chicago, Philadelphia, St. Louis, Milwaukee, Minneapolis, St. Paul, Dallas, San Francisco, Los Angeles, Oakland, Omaha, Cleveland, Detroit, Toledo, Columbus, Buffalo, Rochester, Baltimore, Pittsburgh, Duluth, Seattle, New Orleans, Nashville, Hartford, Conn.; New Haven, Troy, Norfolk, Providence, Marshalltown, Ia.; Madison, Montreal, Toronto, Calgary, Victoria, and 300 other principal points in the United States and Canada.

**121 Kissel Avenue, Hartford, Wis.**





## A Valuable Passenger

With a Willard Battery in your car you're sure of your electrical unit.

You know that when you press the starter button your motor will turn over.

If you use battery ignition you know there is always a good hot spark from a Willard. And you know that a good battery means good lights when you want them.

With these things a motor car is a reliable means of transportation. Without them it is an uncertainty.

**85% of American makers of electrically equipped cars have made their products electrically reliable by choosing the Willard Battery.**

**Willard Storage Battery Company**  
Cleveland, Ohio

NEW YORK: 228-230 W. 58th St. DETROIT: 736-38-40 Woodward Ave.  
CHICAGO: 2524-30 S. Wabash Ave. SAN FRANCISCO: 821 Monadnock Bldg.  
INDIANAPOLIS: 318 North Illinois Street

SERVICE STATIONS IN ALL PRINCIPAL CITIES IN THE UNITED STATES, CANADA AND MEXICO.



# What's the Answer to the Skid Question?



## But To Protect You They Must Be On Your Car!

**W**HEN your car's geared-to-the-road you can put "skid fear" behind you forever. To drive with confidence and comfort—to have your car instantly obey your slightest touch at the steering wheel—to secure absolute traction on slippery city streets or on treacherous country roads, *you must have a tire that is built to meet those conditions.*

Miller "Geared-to-the-Road Tires" are scientifically built to gear your car to the road through mud, sand or slush. With Miller tires on your car you're in control. Its tread is an integral part of the tire and retains its safety features until the entire tire is worn out. The greater mileage you get from them, will make your choice of

## Miller GEARED TO THE ROAD Tires

An economy, as well as a permanent safeguard.

### But Miller Safety Does Not Stop There

Miller mileage and safety on the road are due to exclusive methods of tire building in the Miller factories.

The "Miller Method" retains the natural vegetable wax and oil in the cotton fibre during the process of vulcanization. And this natural lubricant in the cotton means less internal friction and more life and miles in your tires.

Wax and oil carbonize at 240 degrees; the old method requires about 287 degrees to vulcanize a tire.

The Miller Method vulcanizes at a low degree of heat without robbing the fabric of its life-giving wax and oil, and thus saves the fibre from becoming brittle and losing its tensile strength. Your Miller tire has not been "burned out" during manufacture—all its wear, toughness, endurance and all its mileage are preserved for wear on your car.

*There are responsible Miller dealers everywhere—write us if you can't locate yours.*

**The Miller Rubber Company, Akron, U. S. A.**  
*D i s t r i b u t o r s   i n   t h e   P r i n c i p a l   C i t i e s*

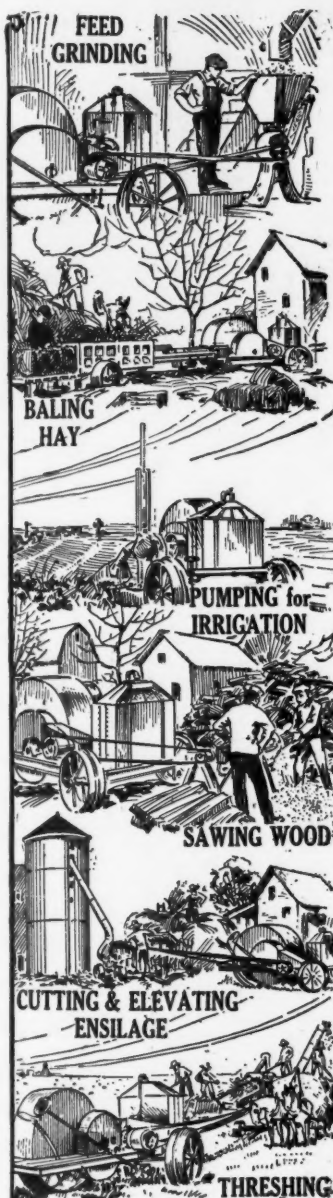
You expect the tread to be strong and secure. But do you know that the tread is at the mercy of the fabric inside the tire? You can't judge a tire merely by its exterior appearance. It is the life in the fabric that makes the MILLER Geared-to-the-road tread doubly effective. MILLER TUBES answer the tube question

*The GEARED TO THE ROAD Tread*



# ANNOUNCING THE SIMPLEX

A BIG - FOUR PLOW - LIGHT WEIGHT - HEAVY DUTY - FOUR CYLINDER FARM TRACTOR



**A Marvelously  
Simple All Purpose  
Farm Power Machine**

**\$765.00**

**A Unit Power Plant  
for All Farm and Road  
Haulage and Stationary  
Belt Work.**

Inquiries from all points are constantly pouring in. The fever of interest is broadcast and country-wide. Agriculturists from the Atlantic Border States—the Pacific Border States—Canadian Border States—Mexican Border States—all—everybody from everywhere unite and proclaim the requirements and necessity for the Simplex are the same and alike.

## The Simplex Absolutely Fills the Bill

The experience of the organization behind the Simplex has made it possible to produce a machine as fitted to every farmer's requirements as if it were made to order for each. The Simplex is not a dinky toy. It is a real full-fledged, right sized, all purpose power unit, built like a battle ship. Last, but not least, the Simplex is priced within the means of all. Every farmer can afford to buy the Simplex and no farmer can afford to get along without it.

The Simplex is designed and destined to be on 6,000,000 American Farms. More farmers will buy the Simplex than would buy automobiles. The Simplex represents an economical necessity. It is not essentially a luxury; yet eliminating the arduous work of hauling around a stationary or portable engine for various belt jobs and the tedium of hobo labor and surplus horse power surrounds its use with a pleasure akin to luxury.

## Thousands Will be Sold. Who Will Sell Them?

The Simplex furnishes power for in the field and on the Belt, and is designed to supply the six million odd farmers in the United States who farm around 100 acres, as well as the few thousand larger grain farmers of the West. It will save **Time—Money—Labor**. Horses, Mules and Oxen do not run a threshing separator, hay press, cut and elevate ensilage, shell corn, saw wood, and a hundred other odd jobs around the farm requiring belt power. The Simplex does.

Stationary and Portable Engines do not plow, disc, harrow, seed, harvest or haul—The Simplex does. The Simplex first costs one-third of what horses cost and thereafter works at half the expense.

## Outstanding Simplex Superiorities.

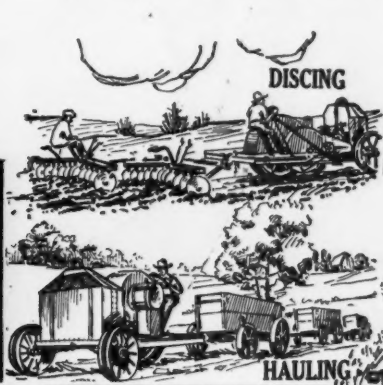
- 1st. A vibrationless, four cylinder opposed motor (this type of motor is not to be found in other tractors listed under \$3,000.00.)
- 2nd. A straight line transmission to the drive wheel (no troublesome power losing bevel gears). All transmission gears solid steel, spur type, run in oil baths (a combination not found in tractors selling under \$3,000.00).
- 3rd. Only one gear in operation in traction work intermediate of crank pinion and bull pinion (the fewest operative gears on any tractor of any make, positively the most efficient gas traction transmission ever devised)—Patents pending.
- 4th. Seven gears only in entire transmission line—provides two forward gear shifts and reverse (the Simplex provides change speeds, yet, notwithstanding, it has the fewest operative gears of any tractor ever designed even of the single speed type)—Patents pending.
- 5th. A speed radius of from 1 to 5 miles an hour (a widely advertised feature of machines costing four times as much).
- 6th. Anti-friction, self-oiling, roller master pinion with replaceable teeth—Patents pending.
- 7th. Full steel, laminated master gear, replaceable in sections if damaged—Patents pending.

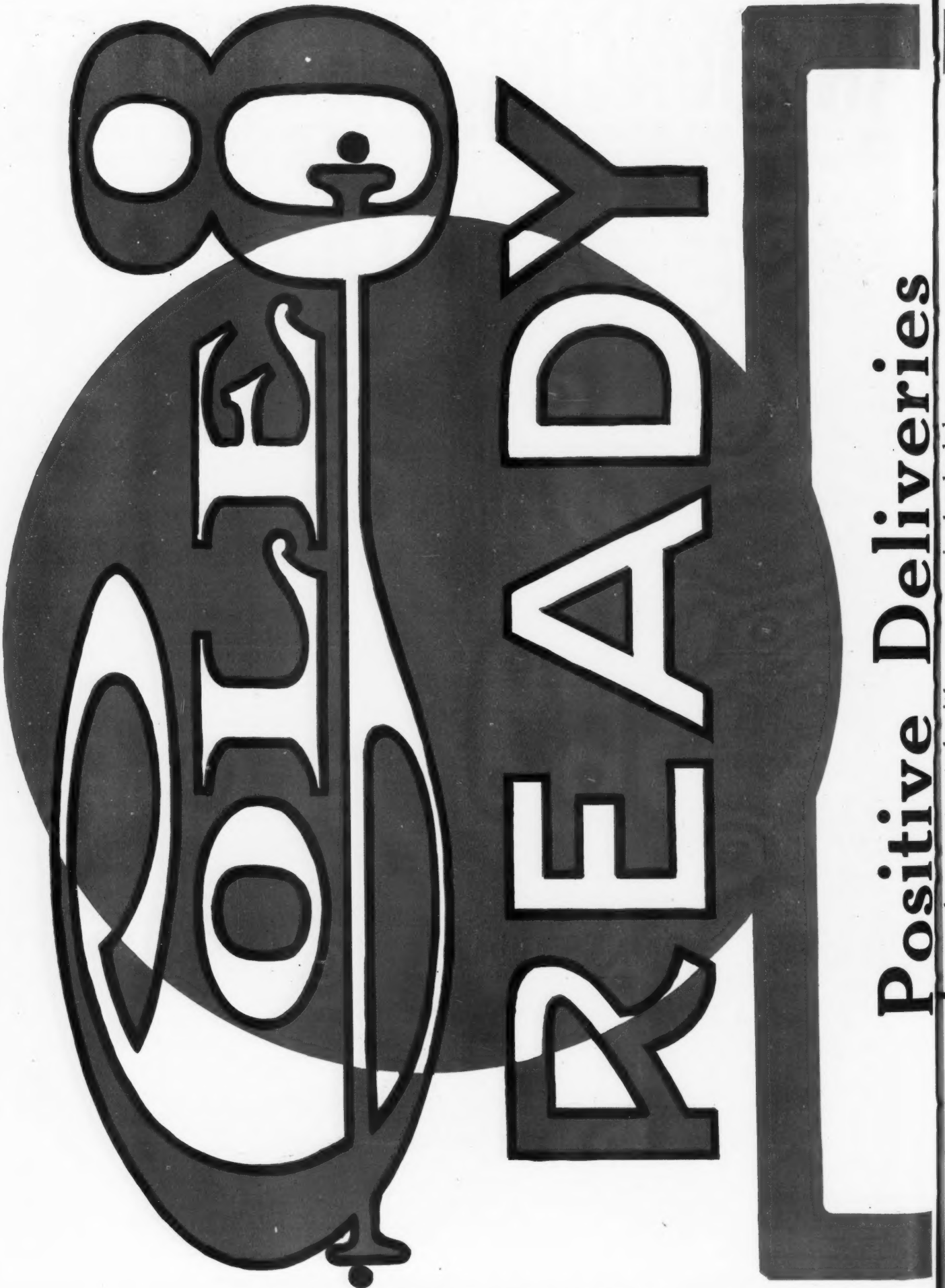
**WANTED, A LIVE MAN**—to handle Simplex Tractors. He may be a banker, merchant, grain, automobile or machinery dealer, or in some other line of business. He must have some money to properly finance and carry out our big money making agents contract, but more ambition and energy and a clean record. To such a One We offer the **Biggest Kind of a Money Making Opportunity.**

**WRITE TODAY**

**SIMPLEX COMPANY**

311 So. 3rd St. ADDRESS Dept B MINNEAPOLIS, MINN.





When Writing to Advertisers, Please Mention Motor Age.

## Positive Deliveries

pany has contracted with  
the Northway Motor Com-

promised schedule.

The Cole Eight will be deliv-



# Positive Deliveries

A pany has contracted with the Northway Motor Company for the latter's entire season's production on the latest Cole-Northway eight-cylinder motor. And the great plant of the Northway Company is already working twenty-four hours a day in certain of its departments in order to avoid

promised schedule.

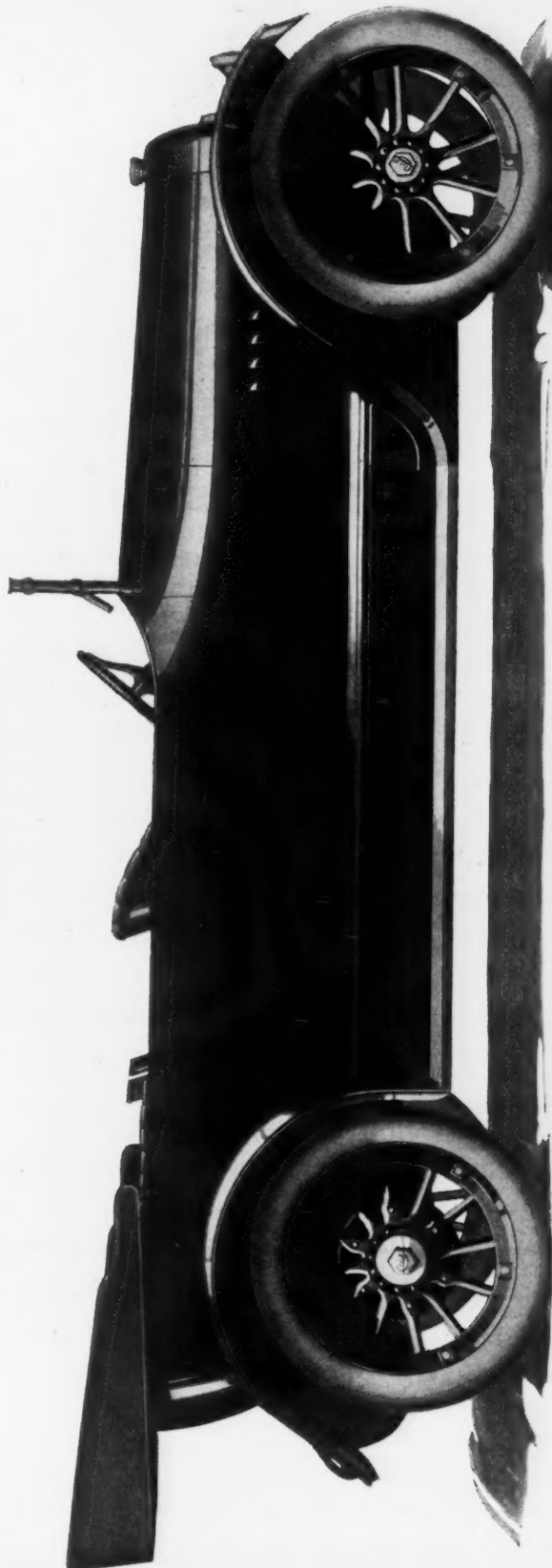
The Cole Eight will be delivered in quantities during March, even if it becomes necessary to install three eight-hour shifts in the Cole Factory.

There is no possible chance for disappointment on deliveries of the Cole Eight.

*See this car at the Brooklyn and Boston Shows*

## Cole Motor Car Company

INDIANAPOLIS, U. S. A.





# 387,000 Cars And

# OAKES

THE results being obtained today with Oakes products on thousands of cars is practical proof of the supremacy of this accessory-building company.

The Oakes Company is more than factories working day and night, and more than a money-making concern. It is an *institution* that sets standards. Oakes experts, guided by years of successful experience, are constructive "fault-finders." They are not content with being mere imitators. They anticipate changes and developments, and then *produce* them. They are not only the builders of new and better products, but are *responsible* for them. This is why Oakes products are never "make-shifts" but actually the latest and best created to *meet* existing needs and not to trail as "excuses to get the money." This is why engineers have learned to depend upon and place implicit confidence in every product bearing the name of "Oakes."

Dealers all over the world appreciate the selling-value of this name "Oakes." It means that every Oakes product will, by its service, prove most economical as well as satisfactory.

### Partial List of Motor Car Builders Using Oakes Products :

Auburn	Paige	Winton	Lexington	Enger	Speedwell
Buick	Regal	Grant	Abbott	Chandler	Havers
Scripps-Booth	King	Glide	Velie	Marmon	National
Chevrolet	Empire	Monarch	Apperson	Pullman	Lewis VI
Overland	Detroit	W. R. M. Motors	Pathfinder	Moon	Inter-State Premier

**The Oakes Company, Indianapolis, Ind.**



# Equipped With Products



## Oakes Horn

The Oakes horn is the only really motor driven horn, being driven by the engine of the car. This eliminates necessity of an electric motor, of wiring system, of batteries, and complicated mechanism. It is the simplest, the safest and the surest auto horn. Best. Meets every horn need.

For further description see "Beartone."

## Oakes Fan

The majority of fans being used as standard equipment today are Oakes fans. After all manner of test by leading engineers the Oakes fan has proven to be the most efficient, most quiet and most durable, able to stand up under all conditions.

A test of a fan is the volume of air plus the manner in which it handles the air through the radiator. The Oakes fan excels in drawing in the air and throwing it back. The Oakes fan does not churn the air in such a manner as to block the entrance of fresh new air.

## Oakes Stamping

Oakes are expert producers of pressed steel parts, famed for their clean edges and accuracy. Plain machined, or assembled into specialties. Oakes excel in the following classes of work:

- Metal Stamping
- Drawing
- Ball Bearings
- Wrenches
- Agricultural Implements
- Cream Separator Parts
- Textile Fittings
- Telephone Fittings
- Electrical Fittings
- Electrical Spot Welding
- Case Hardening
- Annealing
- Machining

## Oakes Beartone

The Oakes-Beartone is a combination of horn and fan, interchangeable with fan on car by anyone in a few minutes. The Oakes-Beartone is in a logical position for a horn, under the hood, in front of the motor, and not at the side and behind where the pressure of the fan chokes the volume of the warning signal back into the horn. The Beartone is in the center of cooling fan on motor—sounds straight through radiator. Touch button at driver's seat and Oakes-Beartone gives any volume or range desired. Not an electric horn, but operated mechanically. No more battery, wires or complicated mechanism to give trouble. No battery expense. For Ford type, \$7.

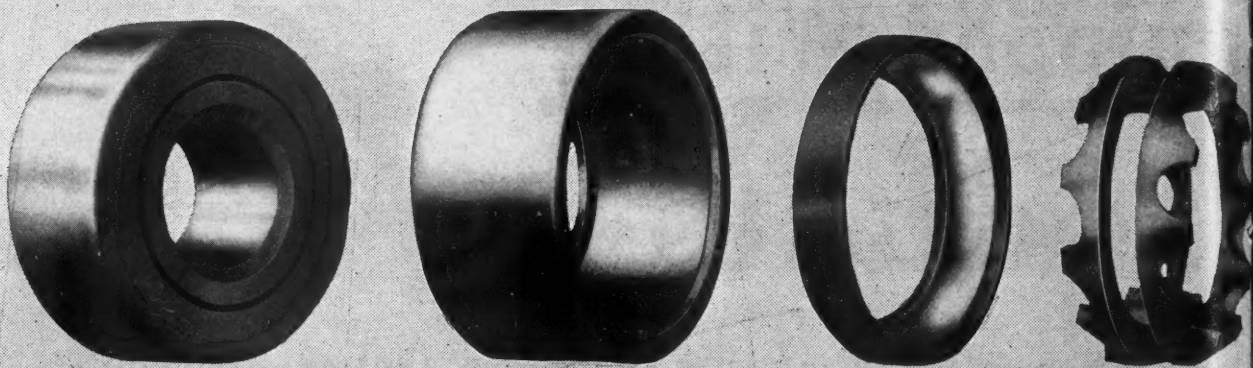
### HORN and FAN Combined



### Partial List of Motor and Parts Builders Using Oakes Products:

Ferro	Golden-Belknap-Swartz	Davis	Warner Gear (Co.)
Continental	Falls Machine	Perkins	Timken Axle (Co.)
Rutenber	Waukesha	Sterling	Weston-Mott (Axle Co.)
Herschell-Spillman	Wisconsin	Mason	Walker-Weiss (Axle Co.)
	Beaver Motor		

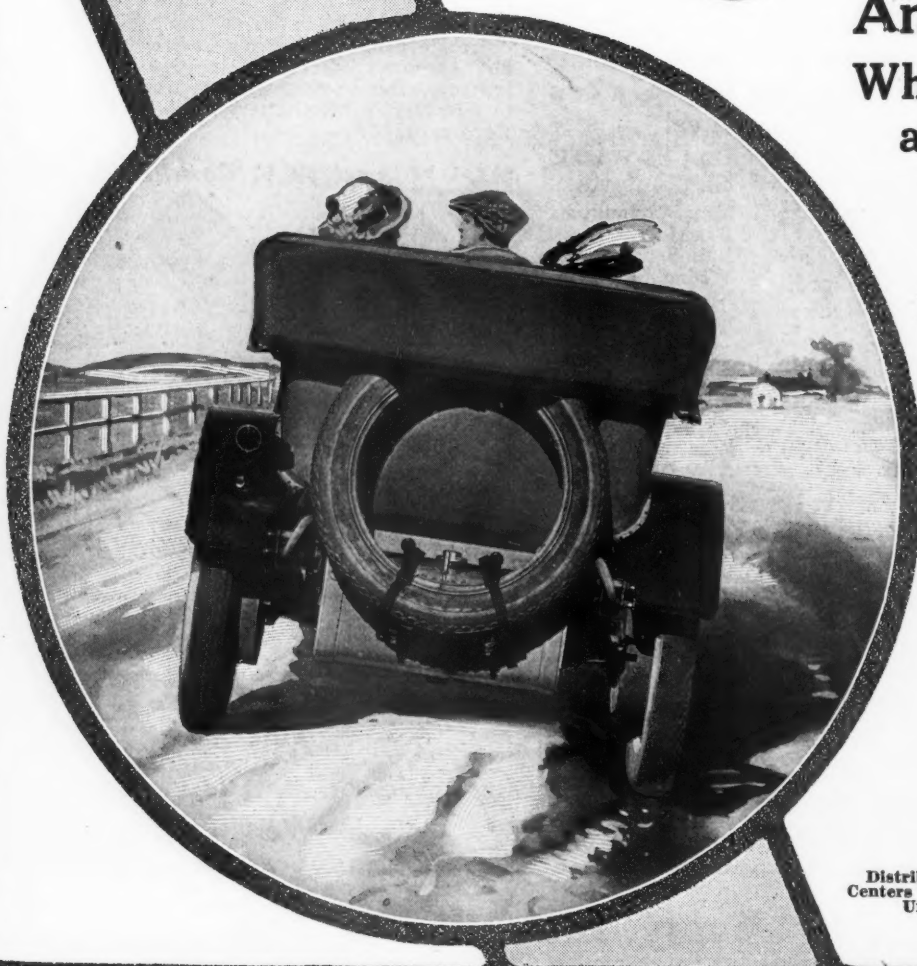
**The Oakes Company, Indianapolis, Ind.**



# THE NEW DEPARR BALL A



**American Made**  
**What It Is and What It Does**  
**and User of American**



**T**HE bearing equipment of any motor car is tremendously important.

The bearings must minimize friction, and upon their ability to do this successfully depends the efficiency of every rotating part, the amount of power actually delivered to the driving wheels, the cost of car maintenance and finally the comfort and safety of the motorist.

Science and practical use have long since proven the superiority of Ball Bearings in the fight against friction.

The weight of the car, the weight of its load, plus the hammer and thrust due to uneven road surfaces and to change of direction, focus at the wheel hubs.

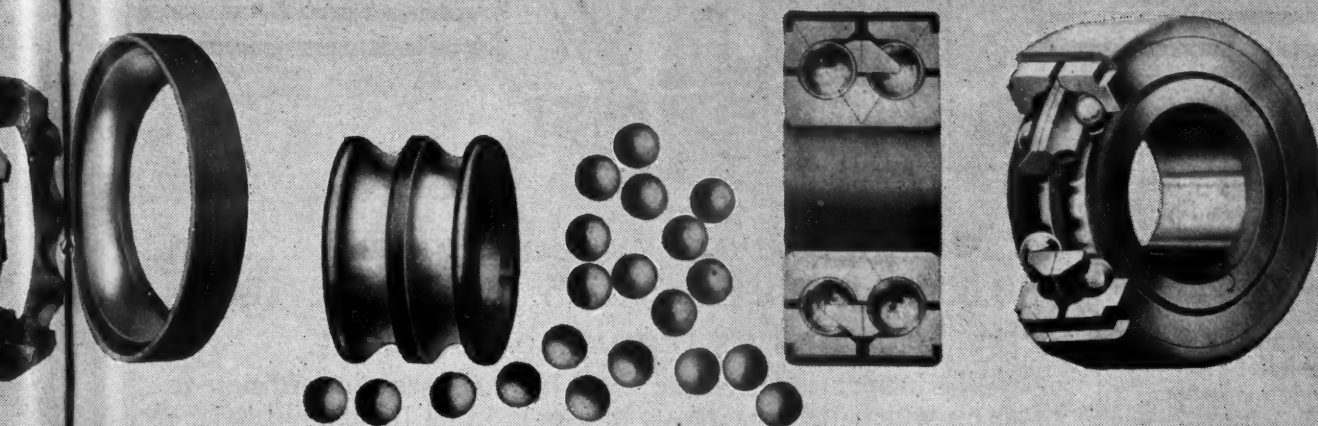
The thrust and torque due to the transmission of power from

Our new catalog describes and illustrates Single Row—Radax and Magna—comprehensive data covering the

Distributors in Trade  
Centers Throughout the  
United States

**The New De M**  
**Bristol, A.**





# ARRE DOUBLE ROW LARING

de American Trade  
Whans to the Builder  
made Motor Cars



motor to driving wheels, focus  
in the transmission, at the gear  
and pinion and in the differ-  
ential.

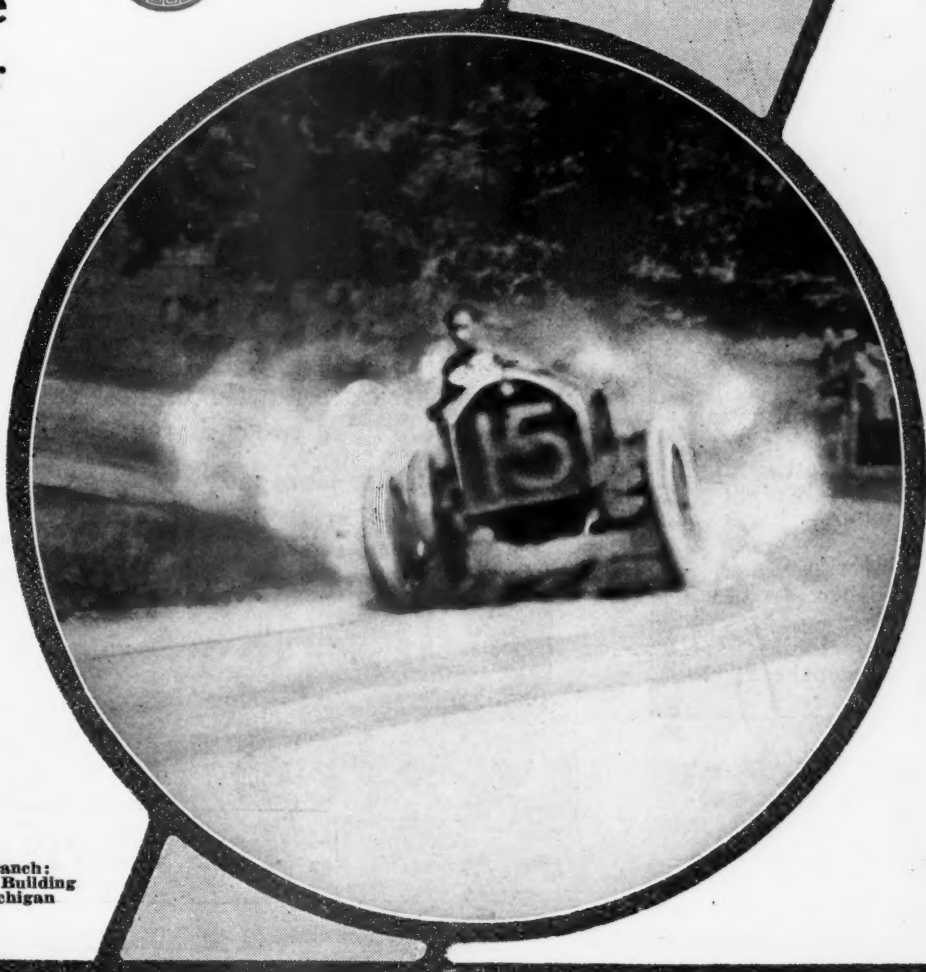
Where these strains and stres-  
ses occur, there the New De-  
parture Double Row Bearing  
has proved itself to be the most  
economically efficient conservator of  
energy yet devised, because its  
two rows of steel balls rotate  
upon their respective raceways  
in such relation thereto that  
they accept all loads imposed  
upon them either radial or  
thrust, regardless of the direc-  
tion from whence they come.

Because they are non-adjust-  
able and require no adjustment,  
and because of the quality of  
their materials which assures a  
working life practically equal to  
the life of the car itself.

The line of New Departure Double  
Row Bearings is in detail and contains besides com-  
plete instructions and care. Send for a copy.

New De Mfg. Co.  
Bristol, Conn.

Western Branch:  
1016-17 Ford Building  
Detroit, Michigan



When Writing to Advertisers, Please Mention Motor Age



The following  
named cars are  
regularly  
equipped with  
Jiffy Curtains:

Abbott-Detroit  
Austin  
Columbia-Knight  
Chandler Six  
Dodge Brothers  
F I A T  
Grant Six  
Hupmobile  
Howard Six  
Hudson  
Inter-State  
Keeton  
Kissel-Kar  
Knox  
Krit  
Lewis  
Lexington  
Locomobile  
Lozier  
Luverne  
Lyons-Knight  
Marmon  
Mitchell  
Monarch  
National  
Oldsmobile  
Paige  
Peerless  
Pierce-Arrow  
Pilot  
Pope-Hartford  
Regal  
R-C-H  
Stevens-Duryea  
Studebaker  
Westcott  
Willys-Knight  
Winton

Made in Canada  
Fisher  
Ford  
Hupmobile  
Studebaker



This tag on the right hand  
rear curtain identifies the  
genuine Jiffy.

Manufacturers producing more than  
180,000 cars of the 1915 model are using  
Jiffy Curtains as regular equipment.

Which means that more than 180,000 cars—in addition to  
those on which Jiffy is already in use—will be Jiffy 'quipt by the  
end of the present season.

These manufacturers are giving their buyers the curtains  
they want.

They are responding to a popular demand.

They are removing every sales obstacle, so far as curtains  
are concerned, that might confront their dealers.

What do **your** dealers say when the prospect asks if the  
car carries Jiffy Curtains?

Must they hem and haw and go through the old "just-as-  
good" formula?

Must they go down into their own pockets to put Jiffy Cur-  
tains on the car?

Or can they say, with a smile, "Yes, sir, this car has Jiffy  
Curtains, and all the other best equipment"?

In that case, they need waste no time on a detail that may  
possibly block a sale or cost them part of their profit to close.

It's time for you to stop and seriously consider the curtain  
question.

Jiffy demand is growing among car-buyers.

They regard Jiffy as an accessory to which they are entitled.

And their right really can't be denied by the manufacturer  
who sincerely tries to put the highest value into his car.

We shall be glad to send you detailed information.

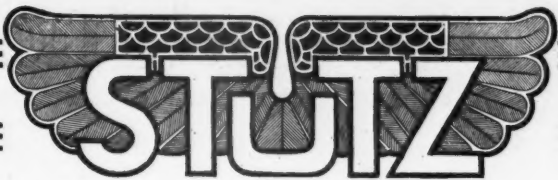
**Jiffy Auto Curtain Company**

**Detroit, Mich.**





**"Consistency, thou art a jewel"---Popular saying**



STUTZ *Consistency* took second and fourth places in the 1915 Grand Prize Race.

STUTZ *Consistency* won and placed in every important road race this year.

STUTZ *Consistency* won the Los Angeles-Phoenix 696-Mile Road Race, the most gruelling service test to which a motor car has ever been put.

Unfaltering *Consistency* made STUTZ America's Road Race Champion.

STUTZ *Consistency* is winning every-day victories on the boulevard, on the long tour, and wherever absolute dependability must be the rule, and not the exception.

### **The Stutz Complete Line**

#### **4-CYLINDER MODELS**

\$1475 H. C. S.	\$2250 Bulldog
\$2000 Bearcat	\$2275 Touring
\$2000 Roadster	\$3675 Sedan

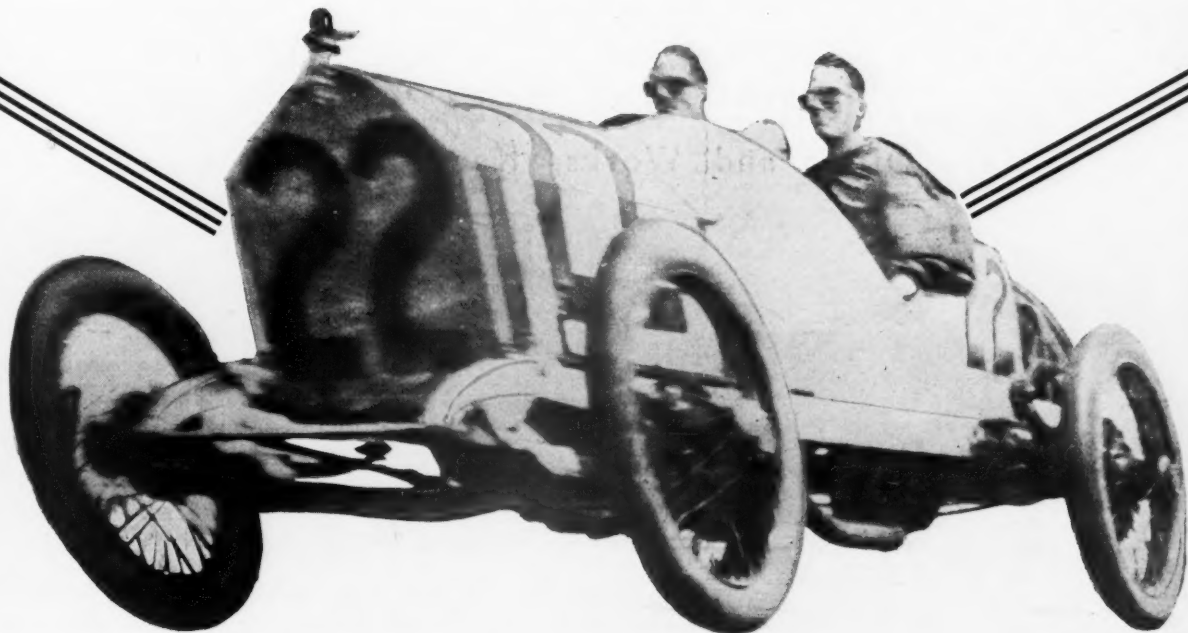
#### **6-CYLINDER MODELS**

\$2125 Bearcat	\$2400 Touring
\$2125 Roadster	\$3800 Sedan

**WRITE FOR CATALOG**

**Stutz Motor Car Co., Indianapolis, Ind.**

*Agencies in All Principal Cities*



*When Writing to Advertisers, Please Mention Motor Age.*



# A Man of Good Sound Judgment—

said the reason he bought a Jeffery was because it best satisfied his idea of what a motor car should be in five leading features.

**Quality**—In every detail of construction where a few dollars determined the difference between the average and the best, Jeffery used the best—he mentioned the Chesterfield Worm Drive; Bijur starting and lighting; Four Speed Transmission; Quality Built Motor and Bosch Ignition as examples.

**Beauty**—Looking at the Jeffery from any point of view the distinctive beauty of body lines gives it an appearance of high tone—an atmosphere of refinement that makes it dominant by comparison with others.

**Comfort**—A ride in a Jeffery is unlike a ride in any other motor car. Lancaster spring suspension on the Chesterfield Six, deep cushions scientifically designed and double seat springs smooth out the roughest roads.

**Economy**—An authentic record, made by a stock car, of 28.6 miles per gallon of gasoline only bears out Jeffery low fuel consumption in every day service.

**Stability**—The Jeffery organization has always built a car that included only the best in materials, workmanship and design, and Jeffery has always been sold on this basis. Jeffery cars have a higher value, three, four or five years after they are sold, than any other.

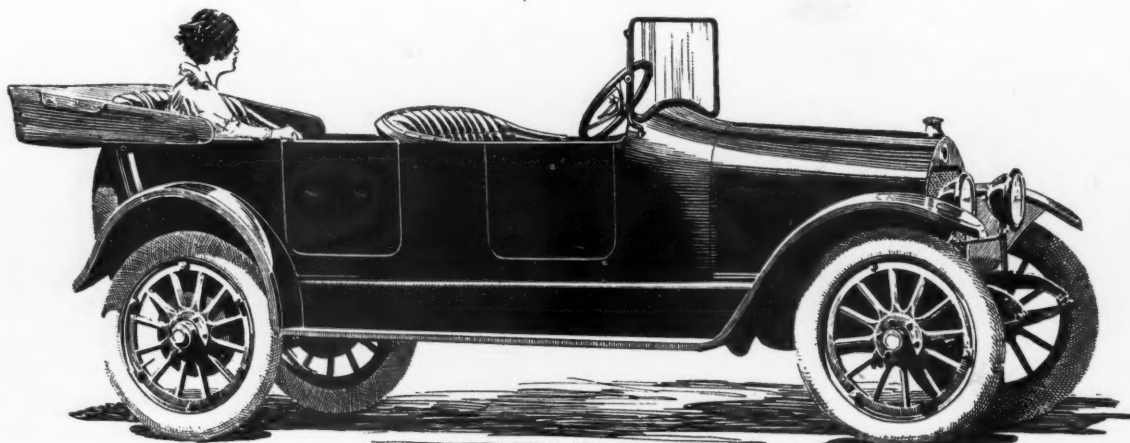
*Chesterfield Six, \$1,650*

*Jeffery Six-48, \$2,400*

*Light Four, \$1,450*

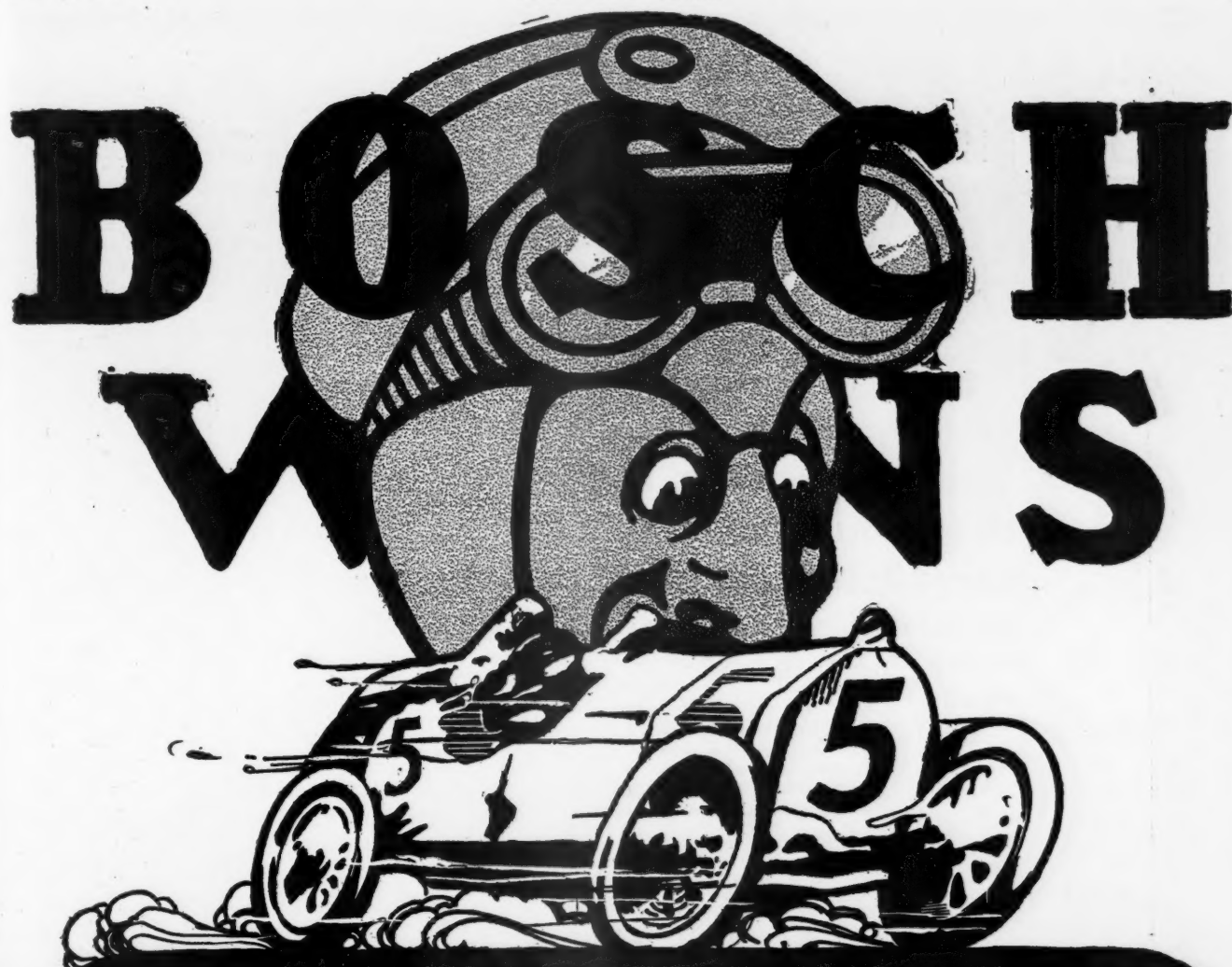
## The Thomas B. Jeffery Company

Main Office and Works, Kenosha, Wisconsin



*When Writing to Advertisers, Please Mention Motor Age.*





# Grand Prize Race

## Another Bosch Magneto Victory

1. Resta, Peugeot . . . . Bosch Magneto (Foreign Plugs)
2. Wilcox, Stutz . . . . . Bosch Magneto and Plugs
3. Hughes, Ono . . . . . Bosch Magneto and Plugs

**All of the Cars to finish used Bosch Magnetos  
Four of the five Cars to finish used Bosch Plugs**

*There's a garage in your town that'll make your car Bosch-Equipt*

**Bosch Magneto Company, 214 West 46th St., New York**

**Over 250 Service Stations to Serve Bosch Users**

# DODGE BROTHERS MOTOR CAR

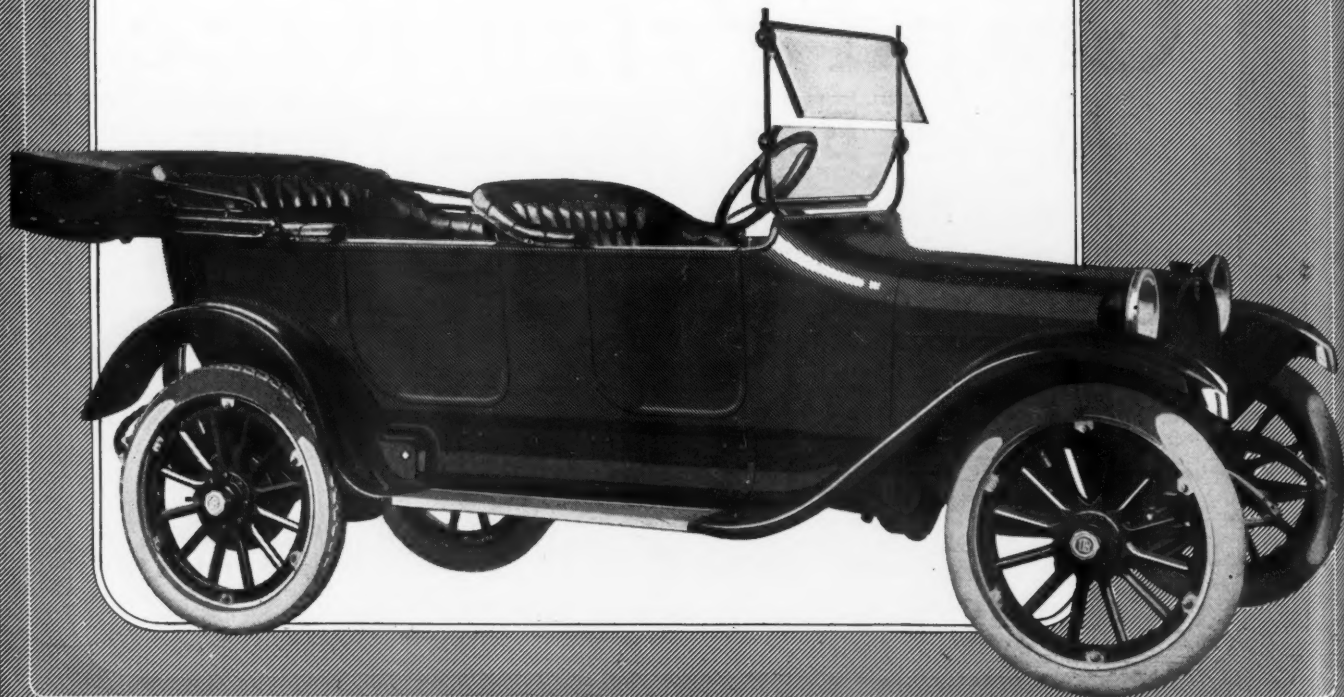
You will realize the very first time you ride in this car that it has all the comfort, responsiveness and power you want in a car

There will be no mistaking the buoyant spring action—the marked freedom from gear shifting—the swiftness with which the car gets under way—the fine balance which makes it stick to the road or the dogged pulling power of the silent motor

The wheelbase is 110 inches  
The price of the car complete is \$785  
f. o. b. Detroit

Canadian price \$1,100 (add freight from Detroit)

## DODGE BROTHERS, DETROIT



*When Writing to Advertisers, Please Mention Motor Age.*





Would you wear any old hat to cover your head if every other detail were correct?

Well, it is just as much of a mistake for you who are so particular in every detail of your car to use any old thing for the top.

In New  
Color  
Effects

**Numotor**  
TRADE MARK  
**FABRICS**

Luxurious  
In  
Appearance

**Are the recognized Standard for Tops,  
Curtains and Upholstery**

**Waterproof**

**Sunproof**

**SO ATTRACTIVE, THEY HELP TO SELL THE CAR**

If you are not using Numotor Fabrics  
write at once for samples and prices



**L. J. MUTTY CO.**  
BOSTON, MASS.





# FEDERAL

## Federal Service Is Extra Service

**U**SERS of Federal Tires enjoy so many advantages that instinctively they think of Federals as the tires of extra service. And back of the tires they find the Federal Company, through its branches and distributors and dealers, ever ready to meet them, more than half-way, with the spirit of fair dealing.

It is easy for us to *stand back of*

### The Exclusive Federal *Double-Cable-Base Tires* ("Rugged" and Plain Treads)

for Federal Tires are not only made of pure para rubber and best quality "square" woven fabric, but Double-Cable-Base construction *eliminates* the four common and costly tire troubles:—rim cutting, tube-pinching, side-wall blow-out just above the rim and the danger of tires slipping from their rims. Federal users do not experience these annoyances and items of expense.

### Genuine Protection Against Skidding

The Federal "Rugged" Tread is scientifically designed to safe-guard your car from skidding, *and it does*. From every angle, the big round projections grip the slippery roadway *tenaciously*.

**Double-Cable-Base Tires are  
made in all styles and sizes**

**Federal Rubber Manufacturing Co.**  
MILWAUKEE, U. S. A.

*Branches, Distributors and Service Stations in all  
Principal Cities. Dealers Everywhere.*



# SERVICE



**REGAL**

## A Complete Line

What your customers want during this crucial year of the automobile business, the new Regal line supplies.

**Three cars**, surpassingly well designed and balanced—thoroughly equipped.

**Three cars**, which combine, each in its respective class, the typical constructive features and conveniences demanded by buyers of new cars.

**Three cars**, models of stream line beauty, in a class with anything produced.

**Three cars**, popularly priced, offering car value never before presented in one line.

**A "V" Type "Eight" at \$1250**

**A Standard "Four" at - \$1085**

**A Light "Four" at - - - \$ 650**

Such cars sell—they have the selling "punch"—presenting for the first time a well designed, beautiful, roomy "four" at the remarkable price of \$650.00. The Regal line takes care of every motor want and interests every buyer. Application for open territory should be made AT ONCE.

### Regal Motor Car Company

401 Piquette Ave., Detroit, Mich.



Light  
"Four" **\$650**

# SAXON \$395



## "Sweet Land of Liberty"

To the Saxon owner, America becomes in a new sense the "sweet land of liberty." The region "just beyond the hills" or the show places of the continent are alike within your reach. You can go anywhere you want, in your daily business rounds or out on pleasure tours, in this sturdy, willing car. No roads are too rough and rugged for it; no mountain climb too difficult.

Letters from all parts of the country tell of the stylish Saxon's never-failing and economical performance.

Mrs. Ray M. Mackey of San Antonio, Texas, writes: "My Saxon is very easy on tires and gasoline. It has the power to climb hills on country roads and to get in and out of traffic on crowded streets without difficulty. I like its neat and up-to-date appearance."

Two Saxon owners, G. W. and J. W. Logan, recently drove from their home city, Tiffin, Ohio, to Los Angeles, California, over every possible condition of road—at a total cost for car operation of \$38.60.

### Ideal Car for Every Day Motoring Needs

Mrs. E. J. Parenteau of Pittsburgh says: "I have driven my Saxon about 5,500 miles and have found it ideal for country driving as well as city use—at an exceedingly small upkeep. On a recent trip from Pittsburgh to Monongahela, we took the wrong road, covering a route where no automobile had ever gone before. So we feel quite proud of our Saxon."

Dr. E. J. Marsh of Oswego, N. Y., gives this testimony: "I have driven

my Saxon nearly 3,000 miles. There isn't a prettier working engine in the world."

From Paul E. Reiff, Saxon owner in New Cumberland, Pa., comes this evidence: "The car does the work to my entire satisfaction and can climb hills on high gear that lots of machines are obliged to take on second."

### Every Added Pound Costs More to Buy and Keep

Every automobile maker today is striving for light weight in design and construction. Why? Simply because

light weight means economy. It makes possible a lower first cost and a very, very much lower after cost.

A few years ago it was different. People rightly expected then to find quality only in heavy, bulky cars. But materials have greatly improved. Steel makers, for instance, have discovered ways of adding strength and saving weight in steels. The Saxon engineers, taking advantage of these and other improvements, are able to produce a car that is light in weight, yet a marvel for strength and endurance.

### Extravagance and False Pride Not Popular

No one apologizes any longer for riding in a low priced car. We no longer have any sense of false pride. It used to be fashionable to be economical—to get the most service for your dollar.

We sell the Saxon car with the absolute confidence that on the average, year in and year out, under all kinds of conditions, it will carry its owner whatever number of miles he wishes to go at less expense than any other automobile.

### Saxon "Six" \$785

This is a big, handsome five-passenger car—of exceptional value. It is fully equipped, including Gray & Davis electric starting and lighting system, and has features usually found only in cars of much higher prices. 112-inch wheelbase, roomy, comfortable streamline body, cantilever springs, 32x3 1/2" tires, demountable rims, one-man top, speedometer. You owe it to yourself to see this modern car before placing an order.

The demand for Saxons is increasing daily.

The merit of this car backed by our nation wide publicity is making the Saxon line still more popular with public and dealer alike.

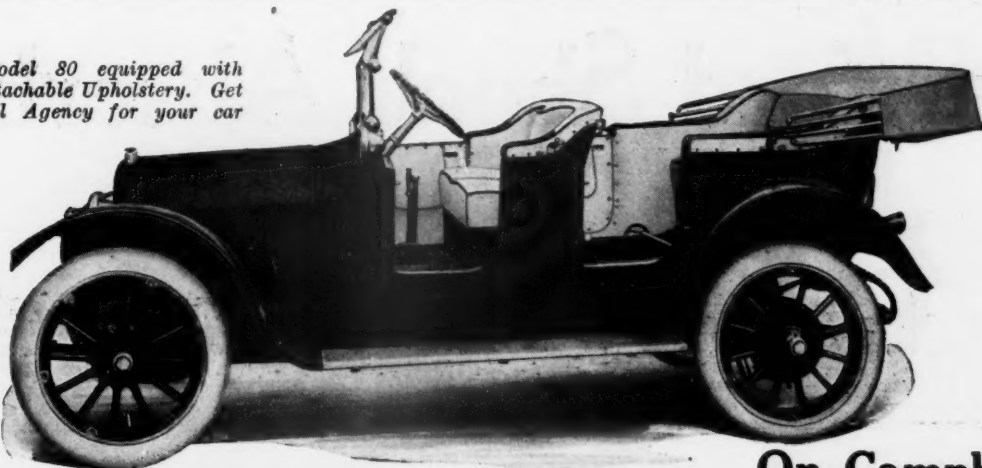
Some territory is still open. We urge prompt action—write today for literature and full information about opportunity in your locality. Address Dept. M.

**Saxon Motor Company**  
Detroit

When Writing to Advertisers, Please Mention Motor Age.



Overland Model 80 equipped with Campbell Detachable Upholstery. Get the Campbell Agency for your car



This button guarantees fit, wear, satisfaction.

Important Notice to Dealers

Reduced Prices

On Campbell Detachable Upholstery

Owing to the enormous volume of business in 1914, we have been able to reduce our overhead and, therefore, selling costs on Detachable Upholstery 60 per cent, and are giving the dealer the advantage of this saving. And remember this! Every set of

Campbell Detachable Upholstery is cut, fitted and tailored as carefully as ever; better, in fact, because our methods are being constantly improved. The reduction in price does not in any way mean a sacrifice in the high quality of fit, workmanship and wear that have made Campbell the leader in the field.

Write us for new price list and our money-making agency plan. It means little or no investment for you and big profits. Write us today.

## CAMPBELL GUARANTEED MOTOR CAR ACCESSORIES



### Percama The Big-Selling Cleaner

Takes grease, dirt, dust, oil out of tops, upholstery, slip covers and rugs. Non-explosive, will not injure waterproofed materials. Retails for 25c per quart, enough to clean a touring car top.

### Write for Catalog and Trade Discounts

We have an interesting story to tell every garage man, supply dealer, repair and paint-shop man, and car agent. Our guarantee of satisfaction, together with



### Ford Dealers and Owners: Read This

The Campbell Latigo Ford Fan Belt is the biggest seller in "Ford-dom." Retails for 50c.

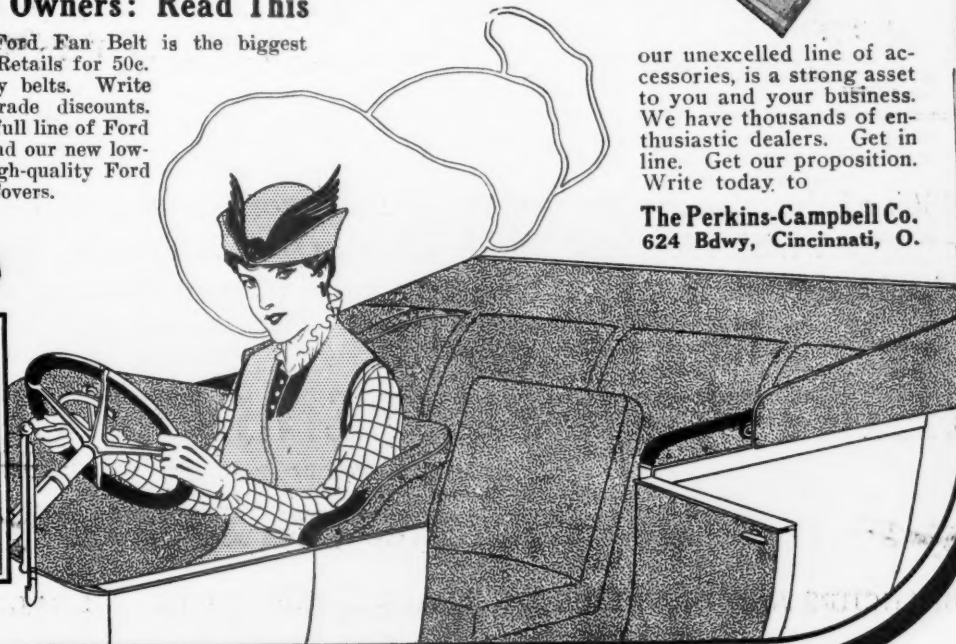
Outwears ten ordinary belts. Write for details and trade discounts.

Investigate our full line of Ford accessories and our new low-priced, high-quality Ford Seat Covers.



CAMPBELL ESTABLISHED 1910

makes sure you're satisfied



our unexcelled line of accessories, is a strong asset to you and your business. We have thousands of enthusiastic dealers. Get in line. Get our proposition. Write today to

The Perkins-Campbell Co.  
624 Bdwy, Cincinnati, O.

# Hartford Shock Absorbers

on

## Grand Prix Winners

Hartford Suspension Company,  
Jersey City, N. J.

Gentlemen:-

It gives us great pleasure to notify you that the Peugeot car which won the Grand Prix Race last Saturday was equipped with Hartford Shock Absorbers.

This car went through the race without a single change of tires and was equipped with non-skid chains.

The shock absorbers were undoubtedly a big factor in helping to bring the car in first.

Very truly yours,

Peugeot Auto Import Company.

95% of the winning cars since the inception of automobile racing have been equipped with Hartford Shock Absorbers. Hartford Shock Absorbers are absolutely essential for racing cars and indispensable for every day driving.

## HARTFORD SUSPENSION COMPANY

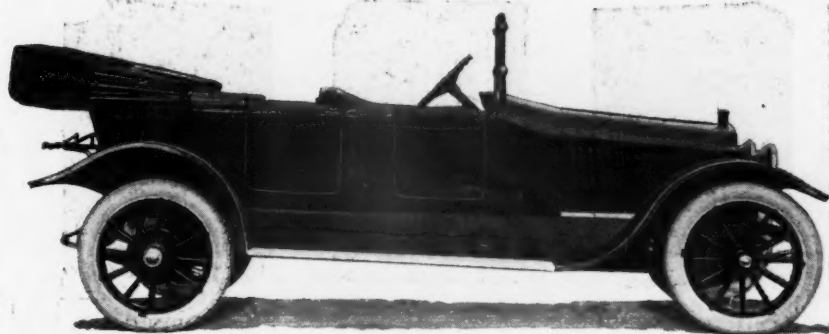
E. V. HARTFORD, Pres.

146 Morgan Street, Jersey City, N. J.

BRANCHES AND DISTRIBUTORS IN ALL LARGE CITIES

DEALERS EVERYWHERE





# Monarch

For 1915

## The Only Company Building Both a SIX and an EIGHT

The Monarch line covers the most popular and most profitable field in the automobile business today. The Monarch SIX and EIGHT are the two most "valueful" cars of any make or model on the market. The men in the Monarch organization are famous throughout the entire industry. Monarch specifications speak for themselves. Responsible dealers will be offered a proposition above comparison with that which any other Company can offer. Study the brief specifications below and write for full particulars.

### Monarch "SIX" \$1250

The Monarch SIX is the equal or superior in size, power, appearance, workmanship and equipment of any car selling for \$1,500. Continental "6-45" motor; Atwater-Kent Ignition; Salisbury three-quarter floating rear axle with quadruple radius rods; Hartford clutch; Zenith Carburetor; Full elliptic Rear Springs; 125-inch wheelbase and Monarch-Ward-Leonard Starting and lighting are an indication of Monarch quality. Strength, lightness and power are combined in this car with complete comfort and low price.

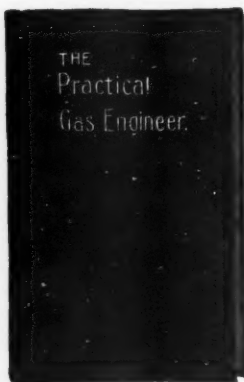
### Monarch "EIGHT" \$1500

The Monarch EIGHT is a revelation in eight cylinder cars. It is high powered, well constructed, and a beautiful car in every particular, a "real" EIGHT, selling at a lower price than any seven-passenger EIGHT on the market. Herschell-Spillman "8-60" motor. Ignition, Atwater-Kent; Rear Axle, Salisbury; Clutch, Multiple Disc; Carburetor, Zenith. Equipment is absolutely complete. This car is the equal of any EIGHT on the market, regardless of price.

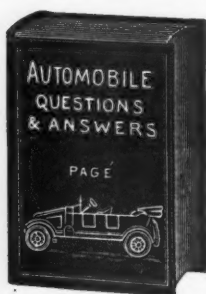
IF YOU ARE A DEALER IN OPEN TERRITORY, WRITE OR WIRE US AT ONCE. THE OPPORTUNITY IS NOW.

### MONARCH MOTOR CAR CO.

R C HUPP PRESIDENT  
Walker and Woodbridge Sts.  
DETROIT, U. S. A.

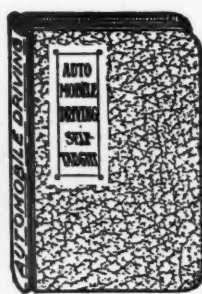


**PRACTICAL GAS ENGINEER.** By E. W. Longnecker. 'Twelve years' constant experience with Hydro-Carbon Engines. How to start, how to operate, and how to care for all classes of explosive motors or engines using gas, gasoline or similar fuels. A full and exhaustive chapter on electric and other systems of igniting. Every line tells something. Every page full of interest. A book of 172 pages, neatly bound in cloth. Sent postpaid on receipt of price, \$1.00.



**QUESTIONS AND ANSWERS** relating to automobile design, construction and repair, by Victor W. Page.

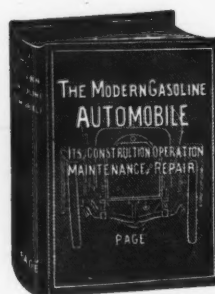
A practical treatise consisting of a series of 36 lessons, covering some 2,000 questions and their answers. Subject matter is correct and explained in simple language. A feature of this book is the treatment of some of the most important motor ailments, their causes, effects and cure. Price (cloth) \$1.50.



**AUTOMOBILE DRIVING SELF - TAUGHT.**

By Thomas H. Russell, M.E., LL.B. An exhaustive treatise on the Management, Care and Operation of Motor Cars. Pocket size, 230 pages, liberally illustrated, handsomely bound in black seal flexible leather, round corners, red edges.

Price, flexible leather, \$1.50.



**MODERN GASOLINE AUTOMOBILE.** By Victor W. Page, M.E.

Its construction, operation, maintenance and repair. 700 pages, 500 illustrations. A late and complete treatise on the modern motor car. Free of technical terms, yet complete in every detail. Covers all phases of motor car practice. Price \$2.50.



**IGNITION, TIMING AND VALVE SETTING.**

By Thomas H. Russell, M.E., LL.B. Pocket size, 225 pages, fully illustrated. A comprehensive illustrated manual of self-instruction for Automobile Owners, Operators and Repairmen. Price, cloth binding, \$1.00.

**TEN BOOKS** that cover the entire automobile field are here offered at from 50 cents to \$3 per copy. Any book mailed postpaid on receipt of price. Order from

**THE CLASS JOURNAL COMPANY**  
910 S. Michigan Avenue, CHICAGO

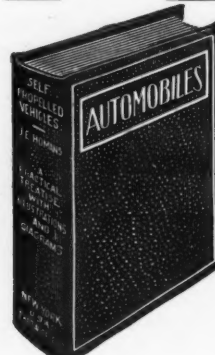
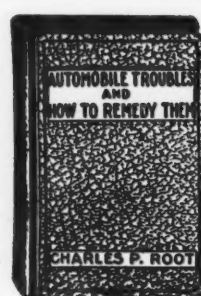
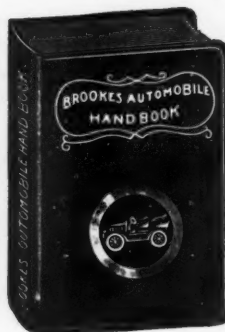
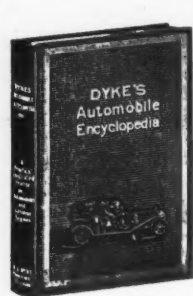
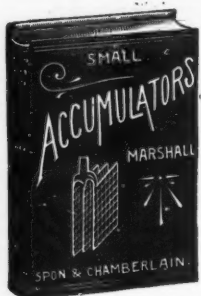
**SELF-PROPELLED VEHICLES.** By James E. Homans, A.M. A practical treatise on the theory, construction, operation, care and management of all forms of automobiles, with upwards of 500 illustrations and diagrams, giving the essential details of construction and many important points on the successful operation of the various types of motor carriages driven by steam, gasoline and electricity. This is probably the best comprehensive treatise published in simple language, so that the contents may be readily understood by the intelligent reader. It is an excellent work to begin with before going deeper into the subject. Size, 5 1/4 by 8 1/4. Pages, 652. With Drawings and Half-Tones. Cloth \$2.

**SMALL ACCUMULATORS.** How Made and How Used. By P. Marshall. An elementary handbook for students and beginners, discussing theory and practice in the construction of small storage batteries, with instructions for charging and using batteries. Size, 4 1/4 x 6 1/4. Pages, 80. With illustrations. Cloth boards, 50 cents.

**DYKE'S AUTOMOBILE ENCYCLOPEDIA.** by A. A. Dyke, E. E. 560 pages. Over 1,000 illustrations. Teaches the Principle, Construction, Operation and Repairing of cars and engines. Covers all valve systems; ignition; carburetion; care of car; adjusting and repairing; digest of troubles; a good index which is handy for the repairman. Electric Starting and Lighting Systems; construction, principle, care of and operation. Simplified so anyone can understand. Prepared for the novice, but a handy and reliable reference guide for the expert. Price \$3.00.

**THE AUTOMOBILE HANDBOOK.** By L. Elliott Brookes. 700 pages and over 320 illustrations. New enlarged edition. Popular edition, full leather limp, \$2.00 postpaid. A work of practical information for the use of Owners, Operators and Automobile Mechanics.

**AUTOMOBILE TROUBLES AND HOW TO REMEDY THEM.** By Charles P. Root, former editor "Motor Age." Pocket size: 5x7 inches, 252 pages, illustrated, handsomely bound in red flexible leather, round corners, red edges. The only book of its kind published. It not only tells you how to locate troubles and make repairs, but shows you. Price, flexible leather, \$1.50.





Effective February 1

# Reduction No. 3 On Goodyear Tires

**Making Total Reductions 45 Per Cent in Two Years  
To Give Always the Most for the Money**

We are glad again—for the third time in two years—to announce a big reduction on Goodyear tires, effective February 1st.

Goodyear policy on price is to give the utmost in a tire at the lowest possible profit. Our reductions are made to that end, without ever reducing the quality.

That always means, with our matchless output, more for the money than any other maker can give.

As rubber came down our prices came down. As our output multiplied, reducing factory cost, our prices came down with it. In two years our reductions—including the present—have totaled 45 per cent.

Last year we increased our output 26.6 per cent. A few days ago the embargo on rubber was modified so that supplies seem assured. The market price for rubber seems for a time established. Fabric costs less than last year. So, under our minimum profit policy, we announce this new reduction.

## Only Fair Basis

We consider profit margin on a tire the only fair price basis. We keep that margin just as low as our line allows.

While we do that, Goodyear tires will always undersell any tires that compare with them. That is because we have the largest output. We have a new factory, modernly equipped. And we have world-wide facilities for buying rubber, of our extra grade, at the lowest market price.

For a long, long time most tires have sold much above Goodyear prices. Some have sold one-third higher. A few have sold lower, as some always will, because of less rubber, less quality. But we can and do, under all conditions, give more for the money than any rival tire can offer.

## The Best We Know

Goodyear Fortified Tires offer the best we know. They are built to give you the lowest cost per mile. They minimize tire trouble in five costly ways employed by no other maker. And they are always the same, regardless of price reductions.

Most tires will always sell higher, because of smaller output. Some tires will always sell lower because of lower standards. But we promise you that none will ever give better than Goodyear value.

This policy has made Goodyears the largest-selling tires in the world. It will make them more so as more men find them out.

Ask your Goodyear dealer for our new price on the size you buy.

**THE GOODYEAR TIRE & RUBBER CO.**  
**Akron, Ohio**

Makers of Goodyear Tire Saver Accessories and  
Goodyear Wing Carriage Tires and Other Types

**GOOD YEAR**  
AKRON, OHIO

**Fortified Tires**

Fortified  
Against

{ Rim-Cuts—by our No-Rim-Cut feature.  
Blowouts—by our "On-Air" cure.  
Loose Treads—by many rubber rivets.  
Insecurity—by 126 braided piano wires.  
Punctures and Skidding—by our double-thick All-Weather tread.



(2282)

When Writing to Advertisers, Please Mention Motor Age.

**S**INCE January 1, 1915 we have taken orders for more than one-half as many **HESS-BRIGHT BALL BEARINGS** as we shipped during the entire year of 1914; *and we are delivering them, too.*

The War has not affected the delivery of bearings to us from our German factory—since the fifteenth of last September we have received approximately 375,000 bearings of assorted sizes. In addition to this we have the benefit of the constantly increasing production of our American Plant.

It is very gratifying to us to be in a position to give our customers such a concrete demonstration of our vast resources.

**The Hess-Bright  
Manufacturing Company**  
Philadelphia, Pennsylvania





The Automatic Switch is the principal reason why  
**Connecticut Automatic Ignition**  
 is not *Ordinary*

**The car you buy should be equipped  
 with a High Tension Magneto**

There are two kinds of ignition—the ordinary battery system and the high tension magneto system.

The battery system is the cheapest. It is not always reliable though many popular priced car manufacturers still furnish it.

The high tension magneto system is the most expensive.

It is the most certain.

It is the most uniform.

Practically all the highest priced cars are equipped with the high tension magneto system.

If, as one car manufacturer claims, a high tension magneto gives better results than ordinary battery ignition.

**AUTOMATIC · IGNITION**  
**CONNECTICUT**

is superior to any—battery, magneto or a combination of both—because—as the result of the thorough saturation of its coil, made possible by its Automatic Switch, it delivers an effective spark at all speeds—a spark at the highest attainable speeds, equal to, if not better than, the magneto's best effort.

In reality CONNECTICUT AUTOMATIC IGNITION is a magneto mechanism less its current generating unit, but due principally to its Automatic Switch its spark grows hotter as motor speed decreases—just the reverse of the magneto's action.

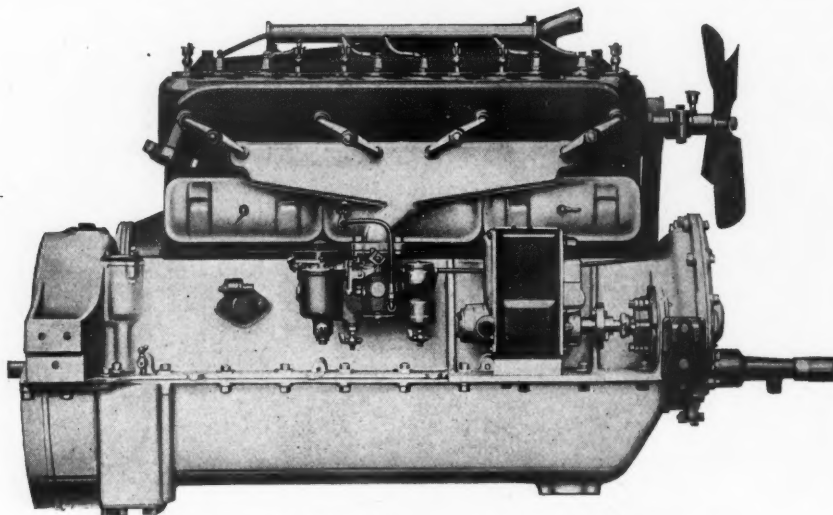
Thus the effectiveness of CONNECTICUT AUTOMATIC IGNITION is tempered to meet the requirements of the motor.

Utilizing the current from a storage battery charged by the dynamo of the car's starting and lighting equipment it has a more uniform source of current supply than the magneto.

CONNECTICUT AUTOMATIC IGNITION is less expensive than the magneto because it needs no dynamo of its own.

While magneto ignition is good ignition at high speeds, CONNECTICUT AUTOMATIC IGNITION is equally good at high speeds and infinitely better at all other speeds.

**CONNECTICUT** TELEPHONE & ELECTRIC **COMPANY, Inc.**  
**MERIDEN** **CONN.**



Westinghouse Lighting Generator Applied to National Car

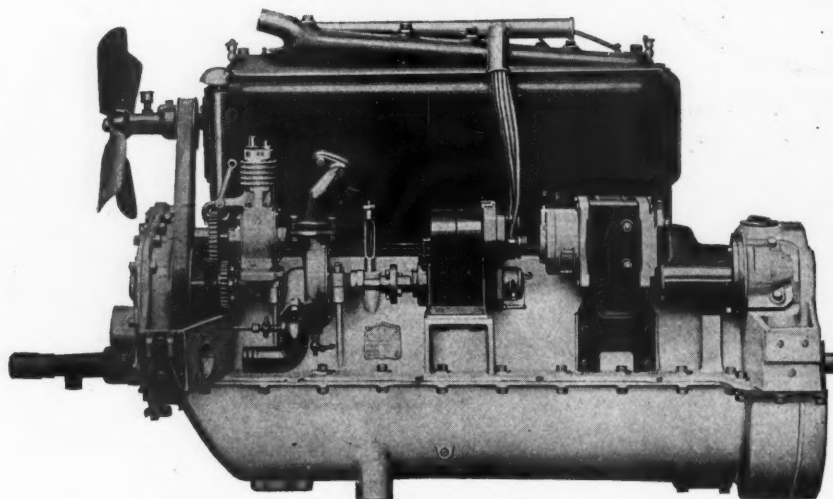
Our long experience in the electrical field is of great value in applying

## Westinghouse Electric

### Ignition, Lighting and Starting Systems

This experience is at the service of automobile builders. Westinghouse engineers cooperated in the equipment of the cars listed below with Westinghouse Electric Systems

Allen  
American La France  
Amplex  
Atterbury  
Auburn  
Austin  
Briggs-Detroit  
Case  
Chadwick  
Crawford  
Davis  
Dorris  
F. I. A. T.  
Glide  
Halladay  
Hupmobile  
Kissel  
Kline  
Lauth-Juergens  
Lenox



Westinghouse Starting Motor Applied to National Car

Lexington-Howard  
Locomobile  
McFarlan  
Marion  
Moreland  
National  
Norwalk  
Ohio  
Pathfinder  
Pierce-Arrow  
Pilot  
Pallman  
Richard  
Seagrave  
Singer  
Speedwell  
Standard  
Stewart  
Vulcan

## Westinghouse Electric & Manufacturing Co.

Automobile Equipment Department



Pittsburgh, Pennsylvania





# "Van"

The speed-meter  
with the big  
white face - -

**YOU** can't stump a Ford car. Van knows. He rides in thousands of them every day. Nor you can't stump Van. The stocky little Ford car knows.

For accuracy, Van is first cousin to a surveyor's instrument. He's sturdy as a bridge, steady as a bishop and reliable as a calendar.

Van looks you straight in the eyes and tells the truth. You can't SHAKE him. He's built honestly and he works honestly.

Van's operation is based on the

generation and calibration of a steadily flowing, infallibly accurate current of air.

Van comes in two models—Special Bracket Type for Ford cars and Flush Type for cowl-board installation. He is unconditionally guaranteed. Write for prices and full information.



Front Wheel Drive for Ford cars. Gears are specially designed, non-wearing, self-cleaning, and will not rattle or grind.

The Swivel Joint will not pack with dirt or mud. Clamps, brackets and 4 bevel gears eliminated. Quickly attached.

**THE VAN SICKLEN COMPANY**  
AURORA ILLINOIS

General Distributors: The Beckley-Ralston Company, Chicago  
Western Representative, T. T. Roe, 847 Golden Gate Ave., San Francisco, California



Flush Type

# WESTERN UNION TELEGRAM

NEWCOMB CARLTON, President

GEORGE W. E. ATKINS, Vice-President

BELVIDERE BROOKS, Vice-Pres.

Received at Corner Congress and Shelby Streets, Detroit, Mich.

Always Open

87CHO 27COLLECT LB

San Francisco, Calif., Feb. 28, 1915

MASTER CARBURETOR CORPN.

944 Woodward Ave., Detroit:--

The Master Carburetor won for me the 1915 grand prize race. The motor never missed once and proved a master of all carburetors.

RESTA

136P

Weather and track conditions were abnormally bad at this great San Francisco Exposition race. The MASTER Carburetor simply repeats its successes

**"Garford"**  
*Hand Operated*



\$4.25

**A Guaranteed Hand  
Warning Signal**

—that penetrates for miles around, in the country, and tops the noise of the city streets.  
300,000 motorists are using—

**"GARFORD" Automobile  
Warning Signals**

The plunger operates at an angle of 45°. Lowest priced signal obtainable.  
A GARFORD insures safety. Ask to see the entire line.

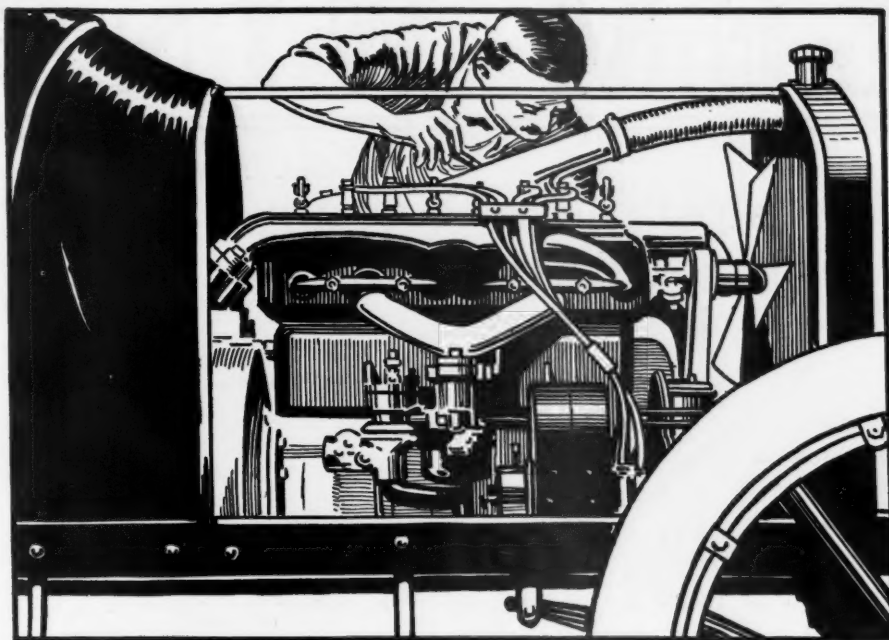
**Dealers**—This \$4.25 GARFORD leads them all. Write for details.

**The Garford Mfg. Co.**  
2503 Olive St. Elyria, O.

BRANCH  
The Garford Mfg. Co., Kansas City, Mo.

DISTRIBUTORS  
The Dean Electric Co., Seattle, Wash.  
The Dean Electric Co., Los Angeles, Cal.  
Sumter Telephone Supply Co., Sumter, S. C.

When Writing to Advertisers, Please Mention Motor Age.



**NOW**  
is the time  
to overhaul  
your car

Even though the  
car has been idle,  
Oil may have  
rotted the rubber  
in the wires.

Automobile manufacturers in their instruction books show from 65 to 75 places to be lubricated. Oil "creeps" and once it gets to your wiring, there is trouble ahead, for Oil works while you sleep.

This hard-to-locate trouble *can* be avoided.

There *is* a cable that resists oil,—it is

## *Packard* Protected Cable

Use it and get Better Service from your Lighting Dynamo Starting Motor, Battery and Ignition System, *and* you'll not have to rewire every Spring.



Combination High Tension Cable



Lighting Cable

**The Packard Electric Company**  
Dept. C WARREN, OHIO

(110)



# OILZUM WINS

A. G. KAUFMAN, President

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## PEUGEOT AUTO IMPORT COMPANY

1620-1624 Broadway

Sole Agents for the United States and Cuba

Telephone Columbus 5889

NEW YORK

Cable Address, Peugeot New York

March 1, 1915.

White & Bagley Company,  
Worcester, Massachusetts.  
Gentlemen:-

It has been the policy of this company to use castor oil in all road and track races.

In the Grand Prix Race February 27, at the Panama Pacific Exposition the winning Peugeot car used "Oilzum" instead of castor oil with excellent results.

The lubrication was perfect and from our experience we cannot speak too highly of your products.

Yours truly,

Peugeot Auto Import Company.

## MAKE \$250<sup>00</sup> A MONTH REPAIRING AUTOMOBILE TIRES

Sounds like a lot of money—IT IS—A WHOLE LOT of MONEY to be earning CLEAR every month—yet it's what hundreds of men we have established in the Automobile Tire Repair Business are making. You let down the DRAW BRIDGE for SUCCESS to enter into your career by getting into business for yourself. The business for you is the one where investment is small—the returns quick and for cash—where the margin of profit is large—the demand for your PRODUCT or SERVICE constant and ever on the increase.

### A Haywood Tire Repair Equipment

answers to all of these requirements of Old Dame Fortune—the certainty of success in this business is as sure as anything in this world can be—Each year adds thousands of new Automobile Owners—they need YOU to keep their tires in service.

#### Here Is Your Opportunity!

Be first to enter this new, big paying business in your town. Open your pockets. Let the dollars pour in. Act quick. Every auto sold means more tires to mend. Automobile business is growing fast—enormous field for tire repairing. Punctures and blowouts are common. Tires need retreading and vulcanizing. Something going wrong all the time. Thousands forced to buy new tires because they can't get old ones fixed. Think of the old bicycle days—repair shops on every corner—all making money—busy day and night. Autos make same proposition over again—only ten times bigger and better. Users of Haywood Tire Repair Plants are making big money. Johnston, Tex., writes: "I have made as high as \$18 in a day." Another man who bought a plant September, 1911, writes he has cleared over \$3000.00. That's going some! Operate a plant as a side line in connection with auto business—garage or as an independent business. Find neighborhood where there's a bunch of autos—get all the steady business besides transient work. Experience unnecessary. You learn quick. Simply follow directions—practice a few days on a couple of old tires and you'll be ready to coin money. Business comes fast and easy.

**HAYWOOD TIRE & EQUIPMENT COMPANY**

#### Repair Tires At Home

Young men! and boys repair father's tires—get money he pays garage man. Get the neighbor's work. Make money to attend college or to start a garage and repair business. Auto owners—repair your own tires—save money—pay for your outfit in short time. We have outfits for home use. Anyhow, investigate. Send today for catalogue. See the wonderful possibilities in this marvelous field. Learn of the enormous money-making opportunities in this fascinating new business.

**720 N. Capitol Avenue**  
**INDIANAPOLIS, INDIANA** The New Money-Making Business—Start Now


# A Straight Tip on Riding Comfort!

A Snubber weighs only about 2½ pounds, but a set of four will make your car with

**One Occupant**

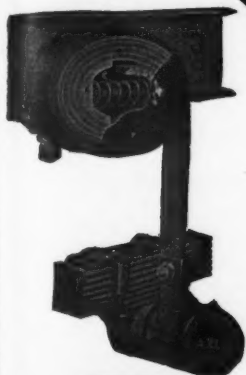
ride as easy as if it carried

**Six Occupants**


weighing 800 pounds more.

Ask any user.

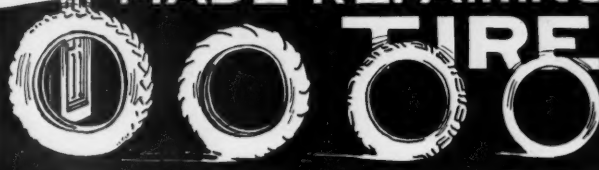
**GABRIEL**  
Horn Mfg. Co.  
1415 East 40th St.  
Cleveland, Ohio



# GABRIEL SNUBBERS



## THOUSANDS OF DOLLARS MADE REPAIRING TIRES



The amount you can make in dollars repairing tires is measured by your own energy. You can make anywhere from \$1500 to \$3000 a year above expenses. Your investment to start in business is small, returns are quick and your income cash. Profits are large on every job you turn out. The tire repair business is in its infancy. It's growing every year, because more tires are being used every year. In almost every city and town there is a crying need for a good tire repair man. **That means opportunity for you.** Start in your home town if you want to. This is a new **money making business.** Don't delay getting busy. But above all be prepared with an equipment that means satisfactory work for your customers. Buy only an

## AKRON WILLIAMS TIRE REPAIR EQUIPMENT

The better your equipment, the better your work and the greater your volume of business. Let us start you in business right. Use an equipment which is

### ENDORSED BY 30 LEADING TIRE MANUFACTURERS

It takes you but a short time to become an expert tire repair man. We help you here. We are making an unusual offer to everybody who buys our equipment. You can become an expert by our plan.

### SEND FOR OUR 30 DAY SCHOOL PLAN

It means when you start in business, you start right. You are prepared to make money from the jump. No experimenting. No Failures. You become a practical, first class repair man.

WRITE FOR CATALOGUE NO. 200.

### WILLIAMS FOUNDRY & MACHINE COMPANY

Waterhouse & Lester Co., Exclusive California Distrib's, San Francisco, Los Angeles

ASH & CANAL STS.  
AKRON, OHIO



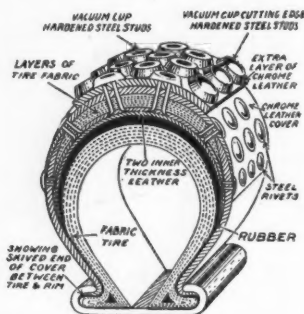
# 10,000 MILES GUARANTEE BACKS THIS TIRE

## Bricton Pneumatic Tires



### Try Them at Our Expense

**T**RY Bricton Pneumatic Tires at our expense. Don't pay until you are satisfied. At our risk find out for yourself what wonderful service Bricton Tires give—how resilient and easy riding they are. Get rid of punctures, blowouts and rim cuts. Bricton Tires are rut proof, oil proof and gasoline proof. They are sold under a specific 10,000-mile written service guarantee.



### Your Tires Rebuilt the Bricton Way

If the fabric in the tires you are now using is in good condition, we can take them, make them proof against rim-cutting, punctures,

blowouts, side wall breaks, skidding, ruts, oil, and give thousands of miles additional service.

Sign and send back coupon for full information and details of our liberal Free Trial Plan

**THE BRICTON MFG. COMPANY**  
1235 Bricton Building  
BROOKINGS, SO. DAK.

#### Mail Back This Coupon

Bricton Mfg. Co., 1235 Bricton Bldg., Brookings, So. Dak.

Please send me full particulars about Bricton Tires, explain your free trial plan, also explain how my own tires can be rebuilt the Bricton Way.

Size of Tires \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

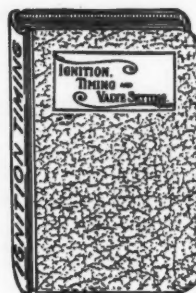
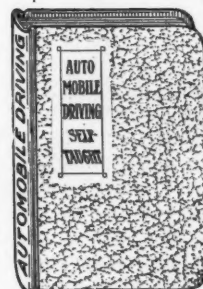
## Books for the Motorist

### Automobile Driving Self-Taught

By THOMAS H. RUSSELL,  
M.E., LL.B.

An exhaustive treatise on the Management, Care and Operation of Motor Cars. Pocket size, 230 pages, liberally illustrated, handsomely bound in black seal flexible leather, round corners, red edges.

Price, flexible leather, \$1.50.



### Ignition, Timing and Valve Setting

By THOMAS H. RUSSELL,  
M.E., LL.B.

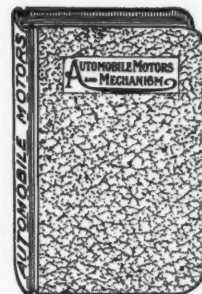
Pocket size, 225 pages, fully illustrated. A comprehensive illustrated manual of self-instruction for Automobile Owners, Operators and Repairmen.

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By THOMAS H. RUSSELL,  
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Author of "Automobile Driving Self-Taught," "Ignition, Timing and Valve Setting," "Motor Boats: Construction and Operation," etc. Pocket size, 265 pages, blue flexible leather, round corners, red edges, fully illustrated. Price, \$1.50; cloth binding, \$1.00.



**The Class Journal Co.**  
910 S. Michigan Ave., Chicago





## Reputation

The social class of a motor car is largely determined by the local standing and excellence of its representation.

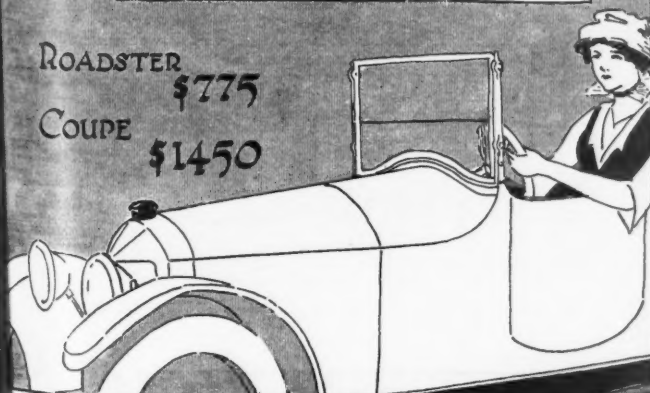
The following list of sales organizations distributing Scripps-Booth luxurious light cars places this new product on a social par with highest priced and most exclusive cars of America and Europe.

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Baltimore, Md.	Randall Mfg. Co.
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Buffalo, N. Y.	Cole Motor Co. of Buffalo
Charleston, W. Va.	Capital City Supply Co.
Chicago, Ill.	Western States Automobile Co.
Cincinnati, Ohio	Ideal Service Co.
Detroit, Mich.	Standard Auto Co.
Galveston, Tex.	Taylor Motors Co.
Hampton, Va.	J. V. Bickford
Hartford, Conn.	Universal Auto Co.
Indianapolis, Ind.	E. H. Wilson
Jacksonville, Fla.	Quality Car Co.
Minneapolis, Minn.	Barclay Auto Co.
Milwaukee, Wis.	Hughes Motor Car Co.
Mystic, Conn.	Mystic Auto Station, Inc.
New Haven, Conn.	Holcomb Co.
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Newark, N. J.	Light Car Distributing Co.
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Providence, R. I.	Albert J. Howard
Portland, Maine	Franklin Motor Car Co.
Pittsburgh, Pa.	L. G. Martin & Son
Philadelphia, Pa.	S. & R. Distributing Co.
Reading, Pa.	J. Miller Kalbach Co.
St. Louis, Mo.	Locust Motor Sales Co.
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ROADSTER \$775  
COUPE \$1450



## A Winner "By Habit"

**T**HIS radiator is the mark of quality. For fifteen years the success of the National has been consistently increasing. Progress has marked every recurring season for the National. Sound business acumen coupled with engineering and manufacturing experience and resources has kept the National always a leader. In contests, in daily service, in general appearance, in comfort and in up-to-dateness the National is a winner by habit.

People take the leadership of the National as a matter of course. There is no "surprise" when National produces a better car. National's constant perfecting is a matter of fact. This is because of the performance of National cars, which has made successful National dealers.

### National Six \$2375

Seven distinct new styles—roadster or touring cars with divided front seats and disappearing auxiliary seats. Special bodies up to \$2850, including Coupe, Cabriolet and Parlor Car with individual adjustable arm chairs. National Sixes develop any part of 55 h. p. at a fuel efficiency up to 17 miles per gallon.

**National Motor Vehicle Co.**  
Indianapolis

## PERFECTION Auto Starter

FOR  
FORD  
CARS

OVER  
8500  
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Operates  
From  
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Engine  
Starts  
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A light push of the lever  
with your foot—that's all

So simple a child can use it. No gas to explode, no batteries to charge; no springs to wind up and no upkeep expense. Neat and out of the way.

### INSTALL IT YOURSELF

A Perfection Starter will make your auto pleasures complete. Catalog and booklet with full instructions for installation sent free upon request. \$25.00 anywhere in the United States.

**50% to Agents. Send \$12.50 for Sample**

And get agency contract. Write at once.

MANUFACTURED BY

**THE PERFECTION AUTO STARTER CO.**  
278 Sixteenth Street DENVER, COLO.

### "I Carry My Autowline Under The Cushion"

Don't think Basline Autowline heavy and bulky, like Manila rope. Basline Autowline is about 25 feet of steel wire rope no larger than a lead pencil but just as strong, size for size, as world-famous Yellow Strand Powersteel rope that contractors use on great construction jobs everywhere. Basline Autowline weighs but 4½ pounds. Coils snugly, with slings and hooks, ready for instant attaching. Stowed under a cushion, where most motorists carry it—

### Basline Autowline

**"The Little Steel Rope With the Big Pull"**  
is out of the way till you, or the other fellow, needs a tow; then it's the handiest thing on the road. Basline Autowline is strong, flexible, long-lived; is no experiment but has already been severely tested by several years' actual road service. Sold by all dealers. Price, east of Rocky Mountains, \$3.95. Why not get a Basline Autowline? Some day you'll need it.

**FREE** An illustrated circular telling all about Basline Autowline.

**Broderick & Bascom Rope Co.**  
813 N. Second St., St. Louis, Mo.  
New York Office, 76 E. Warren St.  
Manufacturers of famous Yellow Strand Powersteel Wire Rope, that is used by big contractors everywhere.



**Master  
Vibrators**

← **This is the  
Only Trade Mark  
Under Which K-W Master  
Vibrators are made & Sold**

You are particularly cautioned against imitations apparently resembling the K-W Master Vibrator in many details and being offered by some dealers under private trade names. Look for the K-W Trade Mark and serial guarantee number.

A handsomely finished box means nothing. It's the electrical detail that makes a Master Vibrator reliable and efficient and years of service alone will prove this. Over 125,000 K-W Master Vibrators giving efficient service is proof that the K-W is electrically right. That is why every K-W Master Vibrator is "Guaranteed for life."

The K-W Master Vibrator is the Standard of Excellence all over the world. It's a tried and proven accessory for a Ford car, with 100% efficiency.

Your nearest dealer will gladly show you the merits of the K-W Master Vibrator. Literature 'on request.

Price \$15 with Kick Switch—with Yale Lock Switch \$16.



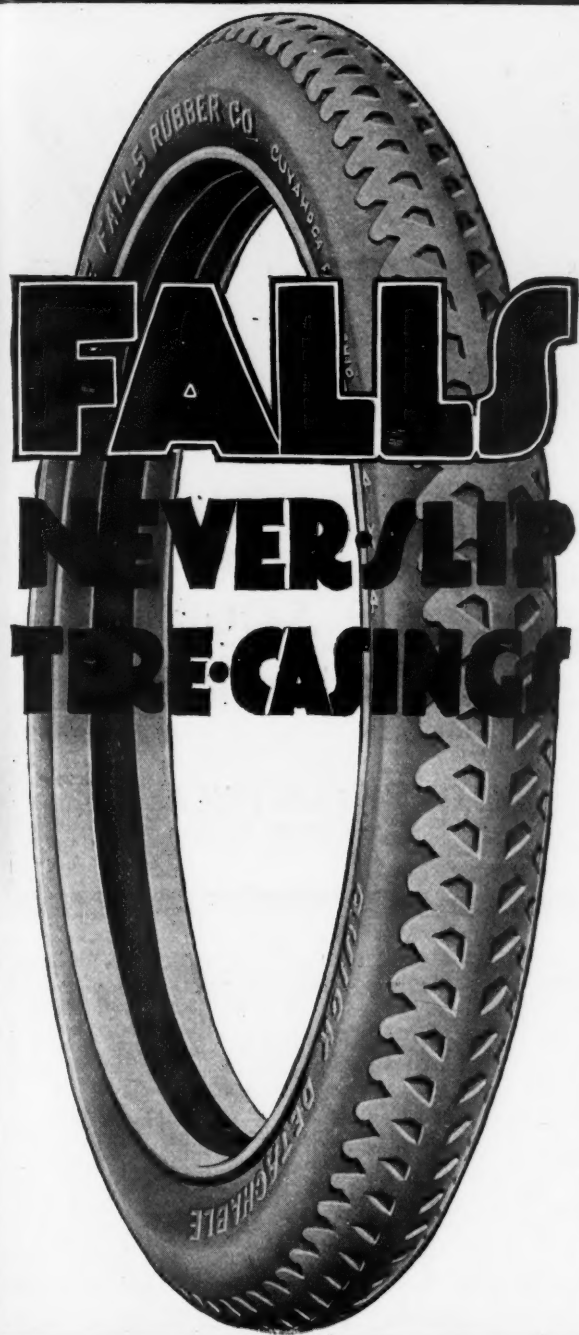
**HEADLIGHTING  
OUTFITS**

**THE K-W IGNITION CO.**  
2835 CLEVELAND, OHIO, U.S.A.

**SPARK COILS  
SPARK PLUGS**

**THERE IS MORE POWER IN  
THAT GOOD GULF GASOLINE  
AND  
SUPREME AUTO OIL**  
MANUFACTURED BY  
**GULF REFINING COMPANY**  
PITTSBURGH, PA., U. S. A.

Dealers—Write for our attractive proposition  
—Send for our free booklet "Progressive Lubrication"



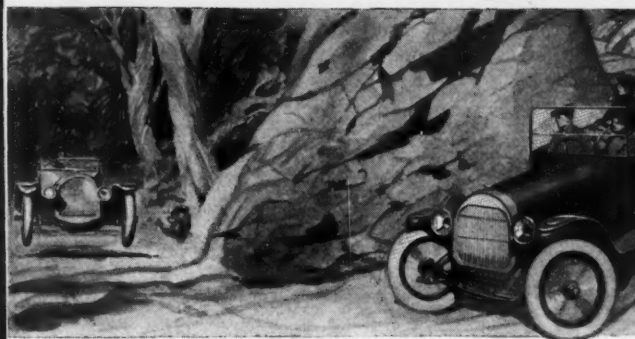
## They Stop the Skid Before It Starts

They "Stand the Run." Protect your pocket-book, your car and yourself by demanding "FALLS" next time.

### THE FALLS RUBBER CO. CUYAHOGA FALLS OHIO

**EASTERN DISTRIBUTORS.** The Falls Tire Co., 633 N. Broad St., Philadelphia, Pa.—Royal Tire Co., 833 7th Ave., New York City, N. Y.

**WESTERN DISTRIBUTORS.** Prigge Bros., 1344 S. Michigan Ave., Chicago—The Denver Rubber Co., 516 16th St., Denver, Colo.—Naegeli & Lamb Co., 1204 Hennepin Ave., Minneapolis, Minn.



## The Hidden Road:

"Why didn't the fool sound his horn?"

But fool-driving is one of the hazards of motoring—a terrible hazard at a spot like this.

How do you know your brake-lining will hold in an emergency? You cannot tell by looking at the outside of the brakes. It's the **brake lining** that stops the car. Brake lining is the frictional substance between the brake drum and brake band. If it is an inferior quality it quickly wears out—gets hard and dry—loses its friction and the brakes fail to hold the car.

## Thermoid HYDRAULIC COMPRESSED Brake Lining—100%

Brake lining to be any good at all must be 100%—must be honest brake lining all through. Not merely on the thin surface outside—not merely a loose and stringy woven lining that is friction shy inside.

Thermoid is forced by hydraulic compression into a solid single substance of uniform density and with 100% friction or gripping power clear through.

It grips even though worn paper thin.

Thermoid is trustworthy. Guard your safety with Thermoid.



**Our Guarantee—** Thermoid will make good—or we will.

**Watch Your Brake Lining**

**THERMOID RUBBER CO. TRENTON, N. J.**



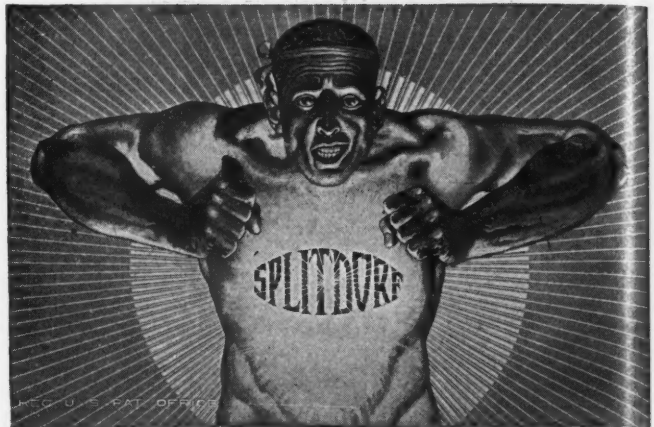


## "Whitney" Chains

Made by specialists in the foremost organization for chain design and manufacture in America. Our aim is dependability of service under hardest conditions, and our success in this is shown by the standardization of Whitney Chains by the leading motor truck makers of the country.

**THE WHITNEY MFG. CO., Hartford, Conn.**

Chains—Keys—Hand Milling Machine



**A DIXIE Magneto  
will give YOUR car  
20th century ignition**

**SPLITDORF ELECTRICAL' CO.  
NEWARK, NEW JERSEY**

## HERE IT IS!

The greatest Shock Absorber ever made, sold at the right price and easily attached by the car owner. These cardinal points make the value:



Pat. Oct. 2, 1914

The four corner bolts keep the spring aligned; whatever way the sway comes, the spring must give a straight pull.

Spring is enclosed dust-, grit- and water-proof in a glove-smooth housing packed with grease.

The sliding cam acts like a wrist of steel; gives to every sway yet holds firmly.

### JUST LOOK AT THE PRICES!

For Ford.....\$11 per set of four  
Cars up to 3000 lbs.....\$16 per set of two  
For cars 3000 lbs. and up..\$18 per set of two

Dealers, by carrying a small stock of the U. S. Absorbers, together with extra springs, can supply the demand of any weight car at a moment's notice.

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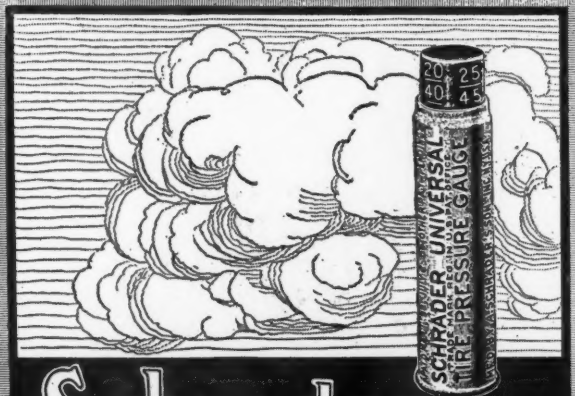
**B. & L. Auto Lamp Co.**

507-509 W. 35th St., New York, N. Y.



Designed to take care of the real problem of protection against shocks.

Pat. Oct. 2nd, 1914



# Schrader

**A** TIRE begins to overwork and overwear the minute the air pressure in it falls short of the inflation prescribed for it by its makers. There is no method yet discovered of ascertaining the pressure in the inside of a tire except by the use of a pressure gauge. A casing containing 40 lbs. of air looks and feels exactly like a casing containing 80 lbs. If your tires require 80 lbs. and you only give them 40, they're on the quick road to the scrap heap.

USE A

**SCHRADER**

UNIVERSAL TIRE PRESSURE GAUGE

and save your tires

PRICE \$1.00

For sale by Tire Manufacturers, Jobbers, Dealers, Garages, or

**A. SCHRADER'S SON, Inc.**

783-791 Atlantic Ave. Brooklyn, N. Y.



Try One  
Free For  
30 Days

Pioneer  
Power  
Pump

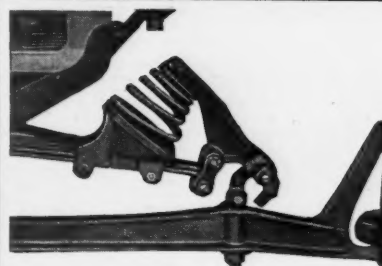
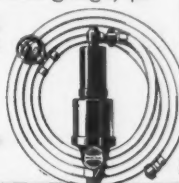
## MAYO SPARK PLUG PUMP

Adaptable to all size cars. Instantly attached by substituting for any spark plug. Pumps pure, fresh air only. Inflates largest tire in 3 to 4 minutes. Built with metal rings like a motor and will last as long. Weight 2½ lbs. Price complete with pressure gauge and 12 ft. hose, \$10. MAYO Q. D. Spark Plug \$1.50 extra.

MAYO Ford PUMPS, complete with hose and gauge, \$8

MAYO Valve Cap PUMP, for permanent attachment to motor, \$15 complete.

MAYO MFG. CO.  
55 E. 18th St., Chicago



## HASSLER Shock Absorber for Fords

The One You Will Eventually Buy Two Years' Successful Use

No Tossing  
No Rebound

Easy Steering  
Safe Driving

The Spiral Spring does not carry the direct load of the car and works over a range of three inches.

The Lever Construction has our Exclusive Patented Stop that Prevents Rebound

Sold on Merit, Quality and Comparison

**\$20.00**  
per Set of Four

Dealers — Write for attractive discount and trial proposition

Robert H. Hassler  
Inc.  
W. 10th & Canal Sts.  
INDIANAPOLIS,  
INDIANA



## The Wilber Universal Motor Stand and Rear Axle Attachment

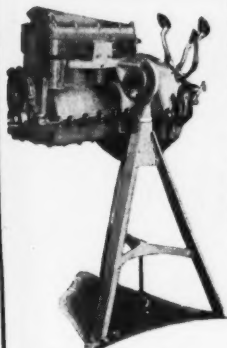
The Wilber Universal Motor Stand and Rear Axle Attachment was designed and built by an expert automobile repair man after many experiments, to fill the long-felt want for a device whereby the mechanic could easily and quickly get at the more inaccessible parts of a motor, transmission and rear axle without twisting himself into all sorts of shapes. The Wilber Universal Motor Stand allows you to turn the engine upside down for easy access to crank and connecting rod bearings, either end may be up as the work requires. Special attention is called to the rear axle attachment, which may be attached or detached in a "jiffy." This attachment will rigidly support and hold the heaviest rear axle and will very much lessen the time and labor of overhauling, as it allows the same universal adjustments as when the motor is mounted on a stand. The mechanic will at a glance appreciate the advantage of this stand over the old method of "rassling" a motor or rear axle around a bench or the floor. Made of the best crucible cast steel, it is unbreakable.

Shipped complete with rear axle attachment, C clamps, hooks and expansion bolt for fastening to cement floor. Price, complete, \$20.00. Price, without Rear Axle Attachment, \$16.00. F. O. B. Minneapolis.

Manufactured by

**CHARLES WILBER**

14 W. 28th St. Minneapolis, Minn.



Fully covered by Patents.

## K-C Safety Lock Patch



**Costs Less Than Vulcanizing**

A vulcanized section costs from \$3 to \$6. The K-C SAFETY LOCK PATCH is practically a new section — at one-third the first price and NO SECOND COST — NO COME BACK!

The K-C SAFETY LOCK PATCH completely encircles the innertube. The Lock, formed by edges dovetailing and secured with a wire key, makes spreading or bulging through the blowout hole an impossibility.

Sold by leading Auto Supply Dealers and Garages everywhere.



**Holds the Largest Blowout!**

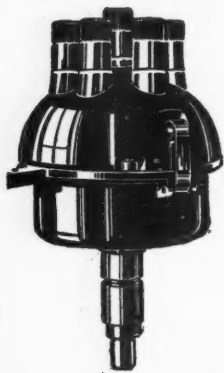
You might cut away a section of casing from bead to bead and this patch, safely locked in, will hold its own pressure! Made of highest quality Tire Fabric, all sizes to fit every make and style of tire.

**Western Tire & Rubber Co.**

"America's Largest Tire Accessory Makers"

KANSAS CITY, MO.





## The Atwater Kent Ignition System

Used on one-quarter of  
all the cars at the  
New York Show

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# FREE!

Motorists, send and get your  
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### "Care and Repair of Tires"

It is a guide and text book that will post you thoroughly. It tells the proper inflation according to weight, load and season. It describes fully how to protect the tires while car is idle in the garage—how to care for them in winter—how to avoid substances that rot the rubber and fabric. It gives splendid hints on the spare tire and its care—how to carry extra tubes. It explains the tire sleeve, the blow-out patch—repair plasters and plugs and emergency or temporary repairs. This book is quoted as an authority by American and Foreign Automobile Publications, because of the authentic information it contains. It's free to any motorist. No obligations. Just write and we will send it to you without cost.

C. A. Shaler Co., 209 Fourth St., Waupun, Wis.



## DYKE'S AUTOMOBILE AND GASOLINE ENGINE ENCYCLOPEDIA

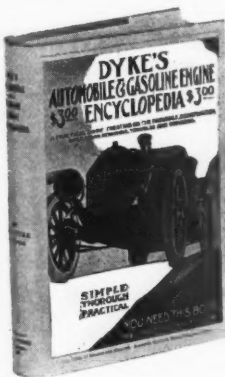
By A. L. DYKE, E. E., originator of the first automobile supply business, publisher of the first practical automobile book, manufacturer of the first float feed carburetor in America

A Teacher, Guide and Reference on everything pertaining to motoring. Simple as the A B C.

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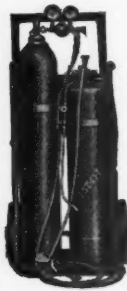
New York, N. Y.



## Prest-O-Lite

(Ready-made Carbide Gas)

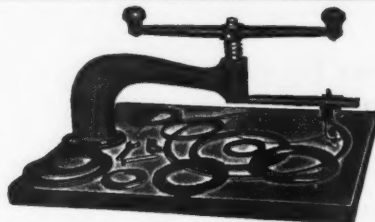
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to determine sizes

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Ask nearest Ford branch or dealer about Ford profit-sharing with retail buyers.

*Ford Motor Company*

Detroit, Mich.



# MERCER POWER

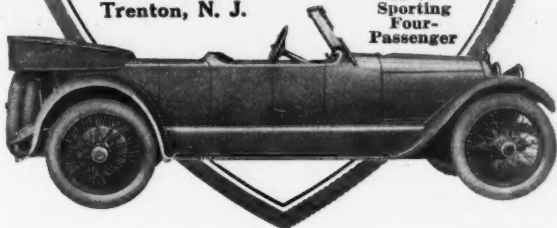
Power satisfaction is one of the greatest pleasures of motoring. Think of the high efficiency four-cylinder Mercer motor—bore  $3\frac{3}{4}$ ", stroke  $6\frac{3}{4}$ "—rated at only 22 H.P., but developing over 70. All the power you can possibly need under any conditions—and plenty to spare. This is but one feature of Mercer superiority.

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**MADE TO FIT  
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FOR FORD CARS

eliminates body side sway and prevents the consequent turning of the front road wheels, unpremeditated by the driver, when rounding corners, turning out to pass vehicles, and when driving over rough roads. It makes a Ford steer and hold the road like a Packard.

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Attached, 50  
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Sent prepaid from factory on receipt of price, with directions for installing, if your dealer is not supplied.

Dealers: Write quick for prices and terms. Every Ford owner is a sure buyer.

**LOCKWOOD-ASH  
MOTOR CO.**  
502 Horton Street  
Jackson, Mich.



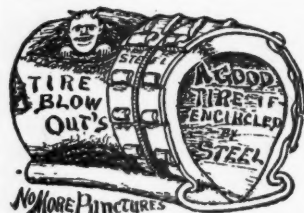
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A Two-Cylinder Tire Pump that gives complete satisfaction is the

## MANZEL TIRE PUMP

**\$20** Complete with all fittings, including 15 feet of air hose, pressure gauge, etc. Perfect construction, finest materials, most accurate fitting—in short, a pump that eliminates tire worries and the dangers due to under-inflation. Easily attached to most all cars—no drilling—no machine work.

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Special prices to the first in new territory

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Tire covered complete



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We wish to announce that irrespective of action by any other organization, Braender Quality Will Be Maintained Braender Net Prices to Car Owners

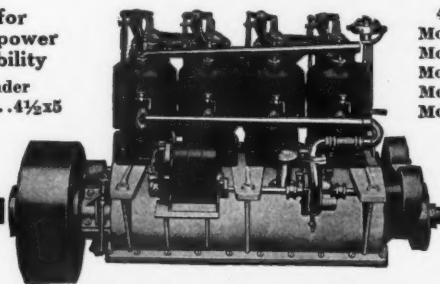
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Famous for  
silence, power  
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We build a special model adapted to Elmore and White Steam cars. Write us for detailed specifications.

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All equipped with the Moore Multiple Exhaust

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152" Wheelbase

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## HOUK Detachable WIRE WHEELS

"The wheel that makes any car modern"

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1742



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It regulates tire pressure, prolongs the life of new tires and insures the old ones. Enables you to carry standard pressure of air in your tires during the hottest day without danger of blowouts.

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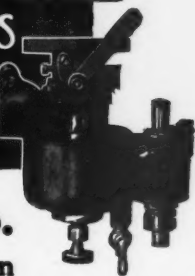
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NO MOVING PARTS  
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Send us make and model of your car and we'll tell you which new model Stromberg is best adapted for it.  
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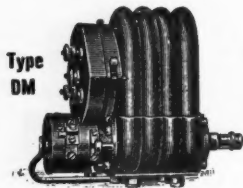
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HEINZE MAGNETOS have proven superior in all competitive tests. This superiority is your guarantee of FREEDOM from ignition troubles.

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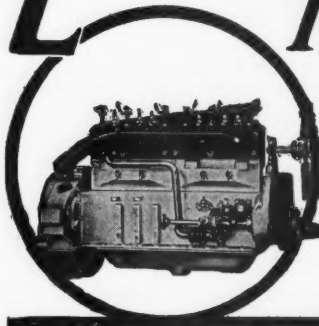
Electric Auto-Lite equipment for automobiles is as famous for the service that backs it as for the reliability and economy of its operation.

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Model 6-N, 3 1/2 x 5      Model 6-C, 4 1/2 x 5 1/4  
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Making their  
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Guaranteed for  
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Write  
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## Inter-State "FOUR"

The one popular priced car with  
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produces a quick, hot spark, always uniform—no missing or late sparks; increases the power of your engine, economizes fuel; makes your engine start easier, run smoother, develop more power. You can go slower on high gear without danger of killing engine. *Simplest Vibrator made.* Only 2-1/2 inches in diameter, neat in appearance; easily installed. Sold under our guarantee of perfect satisfaction or all money refunded. Dealers will find THE CROWE a good seller at a good profit. ALL CROWE users are enthusiastic. *If your dealer does not have it, write us.*

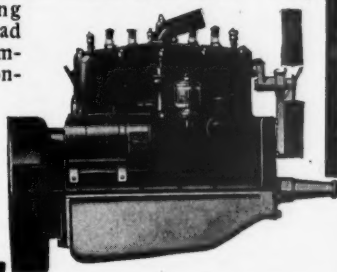
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motors won the first important race of 1915 when Earl Cooper in a Stutz won the Point Loma Road Race. They made racing history during 1914. In ten years of road racing they are official champions. For power, speed, consistency and dependability they are unequalled. Write now for catalog.



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FOR SALE BY JOBBERS, DEALERS, GARAGES, OR

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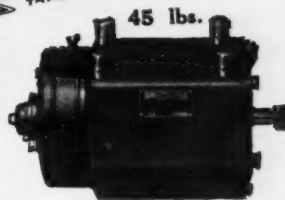
The Single Unit  
Electric Starting  
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GAS, OIL, AND ELECTRIC

CORCORAN LAMP CO.  
CINCINNATI, OHIO

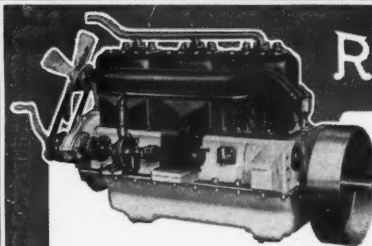
SAFETY  
FIRST  
SOUND  
SPARTON



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PLAIN, "WM"  
AND STAGGARD TREADS

TRADE MARK REGISTERED  
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## THE RUTENBER MOTOR

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YOU can be certain of ECONOMY in OPERATION and MAINTENANCE, Smooth Running, Super-Quality and Appearance, Long Life, Speed, Endurance and Service when you select a car that carries a RUTENBER MOTOR—Four or Six.

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MARION, INDIANA

## Carbon can be removed

from Auto, Marine, and all gasoline motors, quickly and thoroughly, leaving them ideally lubricated and clean like new. Guaranteed harmless—no acid or alkali—just oil. Costs only

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**\$695**

A REAL AUTOMOBILE

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112 inch wheel base. Electrically started and lighted.

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MORE QUALITY for LESS MONEY

The Horn that  
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TRADE MARK

**TIRE PUMPS**

Are easy to use and easy to sell. They are durable and efficient and are widely advertised. The cylinders are of seamless brass tubing which cannot rust. The "Stapley," the "Aeolus," "Windjammer," etc., give lasting satisfaction. Carry them in stock.

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**ISCO**  
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Electric Starting & Lighting System

It Spins the Motor

DISCO ELECTRIC  
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Save Money by Economizing Gasoline

Four floating bronze ball valves opening automatically under different motor suction supply a uniform mixture at any speed, regardless of hot, cold, wet or dry weather.

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3-Ton White truck, standard stake body. Newly painted. Good tires. Used only six months. \$1800.00 cash takes it. Write

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To buy new 1915 Stevens-Duryea inside drive Springfield metal body costing \$1,500. Fit any standard chassis. For quick sale, \$800.

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Jitney cars; three Studebaker closed cars seating five inside; two extra touring bodies for same; also Studebaker 20 and 30 touring cars, Cadillac and Maxwell touring cars; all in good condition; ideal outfit for jitney service.

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nearly new. Have been in service ten months. Will sell one or all of them very reasonable. Address GLOBE GARAGE, Kalamazoo, Mich.

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Two Model 21 Haynes 5-passenger automobiles in good condition, both summer and winter tops, just the thing for taxi business. Price very reasonable. Address Box E 303, c/o Motor Age.

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You will surely find one to fit your requirements. You can get from us good, serviceable machines of various makes for \$400 and up. Let our reputation be your guide.

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Have Two 14-Passenger Sightseeing Cars with solid tires all around, double chain drive, which I will sacrifice if taken at once.

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These cars are fully equipped. Call or write for further particulars.  
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#### OVERLAND CAR MODEL 41

In good running shape, for sale or trade if taken at once.

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of unencumbered land; perfect title; immediate possession; value \$2,000.00; for a late model roadster. Address W. J. ANICKER, Muskogee, Oklahoma.

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Garage, on good paying basis. Must dispose of same on account of sickness. Business has been well advertised and is absolutely clear of debt. Address Box E, 304, c/o Motor Age.

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An experienced man to take charge of automobile assembling department.

The Bimel Buggy Co., Sidney, Ohio.

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### CAPABLE PARTY WITH HIS OWN RACING MACHINE

to enter motor contests throughout the middle west for entire season of 1915, starting May 1st. Must have past experience in track racing and drive a Stutz, National or other car equally well known. Good money and big opportunity for right party. Give reference, past experience, detailed description and model of car with cuts of both car and driver, in first communication. Address Box E. 302, care of Motor Age.

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Selling, Repairing and Exchanging all makes of magnetos and coils. Agents for MARKO STORAGE BATTERY. Batteries repaired and exchanged. 255 W. 57th St., New York City.

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Largest Middle West magneto repair shop.

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### 1915

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30,370 Auto Dealers, U. S. \$40.00 or 2.50 per M  
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All typewritten, showing financial rating.  
Ask for particular territory wanted.

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Exclusive Sales Representatives for Manufacturers who supplied Motors, Axles, Wheels, Transmissions, Steering Columns, Control Levers, etc., to the

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Write for prices on parts needed in connection with American cars.

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We are the sole owners, manufacturers and distributors of repair parts for ALL MODELS AMERICAN UNDERSLUNG CARS.

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**Ampvo 6-volt 100-amp. Batteries, \$10.00 Each**  
Limited sale, absolutely new and guaranteed. Two Willard, one Exide 6-180, like new, \$12.00 each.

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Statite Rings, \$1.00 Each.  
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Most Complete in the West  
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Write for Catalogue

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We have purchased the jigs, tools, drawings of the Atlas Motor Car Co. and are the only concern supplying these parts. Write us, giving model and number. Parts shipped immediately.

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We maintain a complete stock of parts for the above cars.

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New and second hand for many makes of cars for sale cheap. Write us when in need of parts.  
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For any car or truck. Ford wheels with 30x3 1/2 clincher rims \$2.75. 10% discount to dealers.

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Motor parts and accessories for almost any make of car.

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Hand made. We make a specialty of one man tops with Jiffy curtains. Write for prices.  
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We got repair parts, complete stock, all models  
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Now on sale at the Big Shop, where repair parts for all cars are always to be had. Get our prices and we both make money.

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We guarantee them as

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All sizes and makes in stock ready for immediate delivery—At prices that will interest you.

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Closing Out a Large Stock of Bodies

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Splitdorf Magneto Coils (new).....	5.00
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10, 15, 25 gal. Round or Square Gasoline Tanks.....	\$1.00 up

**E. M. F. Motor Parts for sale.**  
Bearings, Ball and Annular, all sizes, at half manufacturer's cost.

**NICHOALDS COMPANY**  
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Cocoa and Carpet Mats, Hand Made Seat Covers, Auto Tops Built and Repaired.  
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## BRAND NEW OVERLAND BODIES

Model 79 Overland touring bodies complete with top and wind shield.

## BIG SACRIFICE

**OVERLAND MOTOR COMPANY**  
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## CLEAN UP SALE

5-pass. fore-door, stream line bodies, upholstered and painted, all sizes and styles in stock, \$55.00 to \$85.00.

Model T Ford Delivery Bodies with top and upholstered seat, carrying space 57"x40", clearance under top 54", \$75.00.

Model T Ford Open Delivery body, flare side boards, upholstered seat, finished, \$50.00.

E. M. F. Fenders, black enameled—per pair, \$4.50; per set, \$8.00.

Spark Plugs—Each 4 for  
Fire Fly, 1/8-18 size only...\$0.25 \$1.00  
Auburn, 1/2" size only......25 1.00

## Garage Assortment

1,000 asst. copper gaskets, all the popular sizes in round and flange types.....\$ 3.00

100 pounds asst. U. S. Std. and S. A. E. cap screws, nuts and bolts, clevis pins, wood screws, etc., etc.....per box 6.00

60 pounds asst. rod ends, spring clips, spring shackle links, adj. yoke ends, plain yoke ends, timer and carburetor levers, clevis pins, etc., etc..... 3.50

Ford Model "T" radiators..... 16.00

High grade cylinder oil, 100 bbls. in the lot, while they last...per gal. .16

Sold in barrel lots only, about 50 gal. in bbl.

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480-500 Prospect Ave. Cleveland, O.  
Do you want our catalogue? It's yours for the asking.

**Croxton, Michigan, F. A. L., Elmore, Deal, Midland, American, Henderson, Repair Parts Furnished.** We also build and repair radiators, cylinders, crank shafts, etc. Department O

**AUTO PARTS COMPANY**  
737-39 W. Jackson Blvd., Chicago, Ill.

**COMMERCIAL BODIES**  
**FOR FORD CARS—14 STYLES**

Painted or in Primer  
Reduced Prices on flare board and screen panel bodies to fit Poss cars

**Motor Truck Bodies and Cab Tops**  
**FAYETTE S. PROUTY**  
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Send for our illustrated cut price auto supply catalogue.

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98 Chambers St. New York, N. Y.



# The Clearing House—continued.

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Equipped with F. & H. Special Wire Wheel Rims. Adaptable to any car. Complete equipment for Ford cars.

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Commercial bodies guaranteed to fit Model "T" Ford. Bucket seats not painted or trimmed. \$5.00 per pair. Trimmed and upholstered backs and cushions, \$15.00 per pair. We also build a full line of Speedster bodies complete; also Am-bulance and Undertakers' cars, all for Ford chassis. Send for our catalog. Agents wanted everywhere.

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Brass for Bushings—Cored brass for bushings, all sizes. Write for prices.

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Made for all old cars without the doors. We have all patterns. Just give us the name of your car.

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Make your 1915 Ford a real streamline car. We furnish you a high grade, well designed streamline hood, all enameled and complete with fittings necessary to make your Ford a real streamline car, for \$7.50. Write for circular.

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New 5x6 four-cylinder, governor-controlled engine, fully equipped, with carburetor, magneto will sell for much less than cost. FRED HANSON, 570 Prior Ave., St. Paul, Minn.

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A small number of modern, well designed and constructed six, five and four-passenger touring bodies and comfortable roadsters painted and trimmed. Write us.

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Auto parts replated. Carburetors, radiators and lamps made like new. High grade work at low prices.

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### "JITNEY" BUS LINE

In your town or neighborhood. Western "Jitney" Bus Owners making \$75 to \$100 per week. 1,500 now operated in San Francisco and 700 in Los Angeles in short time, and is now spreading rapidly eastward.

Why Work for \$25 a Week when on an investment of \$100 you can start in business for yourself?

Write for Particulars—Now.

Below are a few bargains that would make excellent "Jitney" Buses:—Buick, \$150 upward; Fords and Reos, \$125 to \$300; Overland, \$150 to \$300; Chalmers, all prices; Cadillacs, \$250 to \$800; Regal, new, 7 pass., \$595, lists at \$1,750, and a thousand other bargains. Call and be convinced.

### ACCESSORIES REDUCTIONS

New Herschel-Spillman Motors, 4 and 6 cylinder, \$275; other motors, \$65 up. \$300 for-door touring bodies now \$85. Runabout bodies—1914 Ford, new, \$35; others \$40 and \$50. Runabout tops \$15. Touring \$25 (measurement blank sent on request); Racing Seats \$10 each. Spicer Universal joints \$4 each; mechanical oilers \$4 up; windshields \$5 up. Special nickel 1-piece Rainvision shield \$10; Disco self-starter \$5; Remy complete dual system magnetos, Model R. L. and R. D., \$25; others \$5 up; Rayfield, Stromberg and Schebler carburetors \$5 up; gloves \$1 up; Raccoon Fur Coats (special bargain) \$18; double plush robes \$3.50 each. Bulb horns 75c; electric horns, complete with wire and button, \$1.95; hand horns (mechanical), \$1.50; exhaust horns (all sizes), \$2.50; spark plug pumps \$5; double action pumps \$1.75.

### SPARK PLUGS

Special, 5 for \$1; Mosler, 4 for \$1; Timesco, 3 for \$1; Bearings all \$1 up to \$5.

### SPRING SHOCK ABSORBERS

\$12.50 buys the latest in spring shock absorbers, equal to the highest grade on the market selling at \$35. Easy to install. On all good cars as regular equipment. Hartford-Mondex shock absorbers, \$5 each. Rims, detachable or demountable, \$2.50 and \$3.00 each; all makes and sizes. Storage batteries \$6; tool boxes \$1 and \$2; raincoats \$1.00; rubber "slip-on" shirts \$2.50; clocks \$1 up; gas tanks, \$2.50; Prest-O-Lite (genuine) tanks, style B, \$12.50 (complete).

Send for Our "Price Wrecker" Free.

## Times Square Auto Co.

WORLD'S LARGEST DEALERS IN NEW AND USED CARS AND ACCESSORIES.

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### RACING SEATS—RACING BODIES

Fenders, Hoods, Tanks, Panels, Radiator

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We have on hand repair parts for Lozier Cars at reduced prices. Send old parts for replacement.

## Philadelphia Machine Works

67-71 Laurel St., Philadelphia

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We can ship immediately every part for every Michigan car, no matter what the model.

We purchased and are successors to the Michigan Motor Car Co. and have sole access to all patterns and engineering data.

Every part guaranteed to be accurate. Shipment same day order is received.

## MICHIGAN MOTOR CAR PARTS CO.

Successors to Michigan Motor Car Co.  
KALAMAZOO, MICH.

## March Clearing Sale

Spiltdorf Magnetos, Type A, new .....	\$15.00
Spiltdorf High Tension Magnetos, EU-4, new .....	20.00
Elselman magnetos, new, 6-cylinder.....	35.00
Jones Electric Starters, new.....	40.00
Stewart Speedometers, suitable for Car-nation or Ford cars.....	6.00
Carter carburetors, new, suitable for Ford cars .....	5.00
Rear Oil Tail Lights, black and nickel..	1.00
Exide Storage Batteries, 6-140.....	15.00
Meyer carburetors, 3/4".....	3.00
Gas bags for generators.....Each	.05
100 slightly used casings, 34x4 1/2.....Each	7.00
100 36x4 1/2 .....	7.00
Running board tire brackets.....per set	1.00
Ford wire wheels.....per set	12.00
30x3 Car-Nation wire wheels.....per set	12.00
5,000 ft. starter cable.....per foot	.10
47 Spicer Universal joints, 1 1/2x1 1/2 sq....	5.00
500 sets Car-Nation shaft drive rear axles, complete with front axle and wire wheels.....per set	30.00
Barnes Carnation steering gears, complete with wheel, locking gear type....	5.00
Wire wheels, 34x4 1/2.....Each	4.00
Keeton 4-speed transmissions, selective sliding gear type.....	60.00
1 garage portable gasoline tank with register .....	75.00
1 drill press.....	60.00
1 electric bench grinder.....	20.00
5,000 yds. mohair.....per yard	.70
Racing seats, upholstered in mohair.....Each	9.00
4-cylinder motors, new.....	75.00
Storage batteries, 6-120.....	12.00
4-cyl. A. C. Premier used motor.....	40.00
4-cyl. 2 cycle Reliance motor.....	70.00
4-cyl. 4 1/2x5 1/2 Michigan, slightly used....	115.00
Six-cylinder Maxwell, 40 H. P.....	170.00
2-cyl. upright, 2 cycle Atlas.....	55.00
Transmission and clutch for Atlas motor.....	30.00
2-cyl. opposed Davis motor with mag-neto .....	75.00
12 H. P. White Steamer.....	25.00
Used Columbia shaft drive axle.....	20.00
Used Standard shaft drive axle.....	25.00
Oakland W. M. Co. shaft drive and I-beam front axle.....per pair	32.50
New W. M. Co. full floating, 39" spring centers .....	65.00
I-beam 2x3 30 1/2" spring c. to c., N. D. bearings .....	21.00
Solid 1 1/2x2 roller bearings, hubs.....	23.00
34x4 Firestone wheels, 1 1/4" spokes, 9" flange, demountable rims, set of four...	20.00
30x3 1/2 Detroit Demountable.....Set	17.00
34x3 1/2, 36x3 1/2, 34x4, Q. D. clincher rims, set of four.....	7.00
We make radiators at prices lower than can be bought elsewhere. Send sketch and measurements.	
V-shaped brass .....	26.00
Nickel .....	28.00
Roadster and touring car bodies, not upholstered .....	\$10.00, \$15.00 and 20.00
Send sketch and measurements for quotation; 3" and 4" side members, 100 and 168" long.....	\$3.00 and up
Electric starters, same as the American..	25.00
Disco starters .....	19.50
Apelco generator and cut-out.....	29.00
Elselman high tension automatic magneto	35.00
Briggs 4-cyl. with coll.....	20.00
Bosch low tension A. R. H.....	10.00

SEND FOR BARGAIN SHEET

AUTO PARTS CO.  
737-39 Jackson Blvd.  
CHICAGO



# The Clearing House—continued.

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Why pay 20% advance for your repair parts for the old models of MAXWELL cars? We can supply 90% of your wants at the old list price. Transmission gears and parts in stock for Cadillac, Case, Croxton, Dorris, Elmore, Moline, Moyer, Overland, Regal, Selden, Stoddard, Velle and 75 others at cut prices. Why pay more? Send for price list.

**M. P. SUPPLY COMPANY**  
Atlanta, Georgia

## MORE SPEED FOR THE FORD

Special ratio Differential Gears for the Racy Type Ford.

2½—1 ratio.....\$15.00 Set  
3 —1 ratio..... 15.00 Set

Absolutely interchangeable with the present gearing

**DETROIT RADIATOR & SPECIALTY CO.**  
963 Woodward Ave. Detroit, Mich.

## One Minute Ford Tire Tool

This tool will positively completely change a Ford clincher tire in one minute without labor. Will send it postpaid for \$1.00. Dealers, send for circular and dozen price.

Heyn's Bazaar, Detroit, Mich.

Prest-O-Lite Gas Tanks B. \$10.50, Black and Nickel Windshields, \$8, Ford Gas and Electric Head Lamps, \$3.25 pair; Spark Plugs, \$0.25. One-third with orders.

BENEDICT, 63 Winder St., Detroit, Mich.

## RACING BODIES

Bucket Seats  
Jitney Bus Bodies

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### RACING SEATS

High, narrow back, very comfortable. Upholstered in high grade leather. Black, red, brown or any Spanish color. Special price, \$25.00. **CHICAGO AUTO EQUIPMENT CO., 319 So. Jefferson St., Chicago, Ill. Phone Wabash 7244.**

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**NEW GUARANTEED**

Tubular. Honeycomb.  
Ford T.....\$17.00 \$19.50  
Buick 10..... 19.75 22.50  
Hudsons, 20-33..... 29.00 29.00  
Overlands..... 31.00 33.00

We have radiators, both tubular and honeycomb, to fit any car. Write us for prices before buying. Send in your old radiator for repairs. We are experts. We'll make allowances on your old radiator.

### WORLD'S LARGEST DEALERS

in automobiles and accessories. Send for the great

### PRICE WRECKER

the money saver, covering everything pertaining to an auto.

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1210 Michigan Ave. Chicago, Ill.

## Remember

We are the original repair parts factory. We furnish repair parts for over fifty-three models of cars, such as Warren, Elmore, Marquette, Rainier, Welch-Detroit, Welch-Pontiac, F. A. L., Reliable Dayton, Barnes, DeLuxe, Demot, Michigan, Cutting, Northern, Queen, Wayne, Crow, Anhut, Herreshoff, Henderson, and many others. If you want any part for an auto, write us.

## Specials This Week

### TOPS

Cadillac tops, mohair, complete.....\$22.00  
E. M. F. Roadster..... 10.00  
E. M. F. Touring Car..... 15.00  
Chalmers 28..... 22.00  
Hupp 20 Roadster, used..... 6.00  
Maxwell Model 25..... 12.00  
Buick Model 10 Touring Car..... 10.00  
Paige Tops..... 12.00  
Model T Ford, complete with curtains and top boot..... 18.00  
(And many others.)

### RADIATORS

Ford T Honeycomb—guaranteed new.....\$19.50  
Ford T Honeycomb—V-shaped—guaranteed new..... 24.50  
E. M. F.—all models..... 27.50  
Oakland 42—V-shaped..... 30.00  
Oakland 33-40-25..... 27.50  
Hudson 20 Honeycomb..... 28.50  
Buicks, all models—guaranteed new. Get our prices.

### REAR AND FRONT AXLES

¾ Floating Weston-Mott.....\$25.00  
Full Floating Sheldon Axles..... 50.00  
Full Floating Lewis and Weston-Mott..... 75.00  
McCue..... 50.00  
E. M. F. 30 Rear Axles with Transmissions..... 65.00  
Front Axles, all styles..... 10.00

### MAGNETOS AND COILS

4 cyl. Splitdorf kick switch coils.....\$ 8.00  
4 cyl. Remy coils, Models S-T-RL and RD..... 6.00  
4 cyl. Briggs coils..... 6.00  
Splitdorf Tubular Coils..... 6.00  
4 cyl. Remy, Splitdorf, Briggs, Heinze and Pittsfield Magnetos, each..... 10.00  
4 cyl. EU 4 Eisemann High Tension..... 25.00  
4 cyl. High Tension Volta Magnetos..... 15.00

### SPARK PLUGS

Guaranteed regular 75c kind, ½" Standard, ¾" A. L. A. M., while they last....6 for \$1.00  
¾" Champion X, 39c each.....4 for \$1.25  
Motorcycle plugs, Metric, 25c each....4 for 80c

### CARBURETORS

1½" Model G Rayfield.....\$10.50  
Model O Schebler, 1½"..... 5.19  
1" Kingston for Fords..... 3.00  
1½" Kingston..... 3.95

### FOSTER SHOCK ABSORBERS

Complete with fixtures. Set of four, \$4.00

### REAL BARGAINS

11" Bullet Electric Headlamps, per pair.....\$ 6.50  
Electric Tail Lamps..... 1.25  
Electric Bullet side lamps, per pair..... 3.00  
Wheels—all sizes..... 3.00  
Hand operated Horns..... 4.25  
Clear Vision Windshields..... 7.90  
Thermos Bottles..... Each, 1.45  
Deaco Generators..... 18.50

### FORD GEARS AND WHEELS

Special 2½ to 1 and 3 to 1 Differential Gears, per set.....\$15.00  
Complete set of 4 30x3½ Demountable Wheels and 5 rims for your Ford, complete with Rim Brace, etc., complete set..... 22.00

Write for bulletins.

## Puritan Machine Co.

Alfred O. Dunk, Pres.  
410 Lafayette Blvd. Detroit, Mich.

## Paint Your Car Yourself

Save \$25 to \$75 by doing the work at home with the Arsenal system. Our big free booklet, "The Car Beautiful," tells how. Send for it today.

**Arsenal Varnish Company**  
Auto Dept. Rock Island, Ill.

## Radiator Bargain

in Studebaker Radiators

We have a quantity of radiators for Studebaker cars on hand, and offer them for immediate sale at an exceptionally low cash price.

Every one is a new Fin and Tube radiator, guaranteed to fit.

Studebaker 35.....\$23.50  
E. M. F. 30..... 23.50

Send in your check now—They won't last long

**Detroit Radiator & Specialty Co.**  
963 Woodward Ave. Detroit, Mich.

### RECTIFIERS

to charge from A-C circuit 1 to 8 ignition, lighting or starting batteries at one time; \$12 and upwards. **AMERICAN BATTERY CO., 1124 Fulton St., Chicago.**

## We Tear 'Em Up and Sell the Pieces

**We Can Save You Money on Repair Parts or Supplies for Your Auto**

Can supply you with Crank Cases, Crank Shafts, Cam Shafts, Cylinders, Pistons, Connecting Rods, Radiators, Gears (any style), Timers, Magnetos, Coils, Carburetors, Manifolds, Water Pumps, Transmissions, Rear and Front Axles, Wheels, Steering Gears (complete), Steering Wheels, Gasoline Tanks, Wind Shields, Springs, Bodies, Seats and Cushions, Jacks, Tires and Tubes, Head Lamps, Side Lamps and Tail Lamps (any style), Prest-O-Lite and Search Light Tanks, Horns, Mufflers—in fact, any part of an auto.

**We also buy old autos—condition no object—or any part of an auto, or if you want to trade parts we will trade with you.**

**OUR GUARANTEE TO ALL—IF NOT SATISFIED WITH YOUR BARGAIN, RETURN AND WE WILL REFUND YOUR MONEY.**

### SPECIAL BARGAINS

New Ford Wheels, 30x3.....\$ 2.00  
Rain Vision Wind Shields, brass finish... 10.00  
Electric Horns with cord and push button..... 2.50  
Umph Timer, 2 and 4 cyl., new..... 2.00  
Splitdorf Magnetos..... 15.00  
Mercedes Type Radiators..... 12.50  
Electric Tail Lamps..... 1.25  
Comb. Trunk and Tire Holder..... 1.50  
Crank Shaft, Model T Ford..... 5.50

### MOTORS

**We carry a large line of 2, 4 and 6 cyl. motors in stock. Send for list of same.**

## AUTO WRECKING CO.

Old Church, 13th and Oak  
KANSAS CITY, MO.

# The Clearing House-continued.

## SAFETY FIRST

Send your orders to a concern that guarantees their goods.

We handle nothing but brand new material, consequently we can stand behind everything we sell.

### CROWN FENDERS

For Ford cars.

These are selling like "hot cakes."

Order right now.

Set of 4, enameled black.....\$12.00

### DEMOUNTABLE WHEELS

For Ford and Maxwell Cars.

We will furnish 4 wheels and 5 rims, 30x3 1/4, with all bolts and wedges. Complete set.....\$18.00

### FORD SPECIAL GEARS

Get 60 miles per hour from your Ford.

Differential ring gear and pinion either 2 1/2 or 3 to 1 ratio.

Per set.....\$12.00  
Ring gear-Standard Ford ratio..... 3.75  
Pinion Standard Ford ratio..... 1.00

Dealers write us for attractive proposition.

### RADIATORS

Guaranteed new honeycomb type.

Ford Model T, straight type, \$18.50; Ford V-shape, \$23.50; Hupp 20, \$25.00; Buick 10, \$27.00; Buick 16-17-19, \$32.50; Buick 21, \$28.00; Hudson 20, \$25.00; Hudson 33, \$30.00; Abbott-Detroit, \$34.00; Marion 30, \$32.00; Michigan 33 and 40, \$30.00; Warren-Detroit 30 and 40, \$30.00. We have a radiator for every car. Get our prices.

### BRAND NEW TOPS

These are all complete with the famous Collins inside curtains and top boot. Curtains always in position and ready for the storm.

Ford touring, 32 oz. rubber.....\$18.00  
Ford touring, mohair..... 18.50  
Ford roadster, 32 oz. rubber..... 11.50  
Ford roadster, mohair..... 15.00  
Flanders 20, mohair, 4-passenger..... 20.50  
Buick 10, mohair, 4 passenger..... 20.50  
Krit, 4 passenger, mohair..... 20.50  
E. M. F. 30, mohair, 5 passenger..... 22.00  
Overland, 5 passenger, mohair..... 22.00  
Hupp 20, 4 passenger, mohair..... 20.50  
Hupp 20, roadster, mohair..... 17.50  
Hudson, 4 passenger..... 20.50  
Abbott-Detroit, 7 passenger..... 25.00

Mohair tops for all cars.

These tops are all new and guaranteed to fit your car. Give us name of car, model and year built.

### SPEED TRANSMISSIONS

Absolutely new 30 to 35 H. P. transmissions for center control, complete with control levers, 4-point suspension, and can be hung in any frame.....\$50.00

### SPECIALS

Cadillac roadster, bodies upholstered....\$ 50.00  
30 H. P. unit power plants, complete.....214.00  
Gabriel snubbers, per pair..... 4.00  
60-mile Stewart speedometer heads..... 4.00  
Jacox steering gears, with wheel..... 10.00  
Gemmer steering gears, set any angle..... 8.00  
Baker wheels for Cadillac cars..... 3.00  
34x4 and 4 1/4-inch Q. D. wheels, Cadillac. 3.00  
Model D Splittorf magnetos..... 10.00

Why buy junk when you can buy new material at these prices?

**Automobile Specialty Company**

475-477 Woodward Ave.,  
Detroit, Mich.

## RADIATOR BARGAINS

Ford Model T Tubular.....\$16.00  
Ford Model T Honeycomb, V-shaped..... 25.00  
Buick 10 and 17..... 28.50  
Buick 10..... 20.00  
Hudson 20, 32 and 33..... 28.50  
Chalmers 30..... 30.00  
Everett 30 Tubular..... 14.00

Write for prices on any other makes

**AUTOMOBILE APPLIANCE CO.**  
1436-38 S. Michigan Ave., Chicago, Ill.

## SEAT COVERS

For Automobiles are rapidly becoming a necessity. Dealers are enthusiastic over our proposition.

Write for Descriptive Catalogue and Samples  
**WISCONSIN AUTO TOP CO.**

Dept. 5, Racine, Wis.

**SHIP THAT TROUBLESOME CARBURETOR**  
by Parcel Post. We rebuild and install new parts. Factory testing methods used. Service Station for Rayfield, Schebler, Stromberg and Holley. All work guaranteed. Wills, Carburetor Specialist, 358-360 Belleville Ave., Newark, N. J.

## TRAILERS

Solid rubber-tired trailers, 1,000 lbs. capacity, minute attachment. Box 42x72 inches with flare boards.

Flare board bodies for rear of Ford roadster bodies, two sizes, 31x46x10 in., and 31x60x10 in. Dealers write for prices.

**JOHN C. NAGEL, 425-33 Baker St.**  
DETROIT, MICH.

## VULCANIZER, SLIGHTLY USED

AS GOOD AS NEW. FOR SHOP USE.  
A GREAT BARGAIN

Vanderpool's, Springfield, Ohio

## 22 H. P. Unit Power Plant

three speed transmission, center control, new goods, guaranteed direct from manufacturers. Best automobile engine bargain ever offered. \$160.00.

Kermath Mfg. Company, Detroit, Mich.

## PARTS AND ACCESSORIES WANTED

## WANTED AND FOR SALE

Wanted—One Bowser outside pump head. For Sale—One Warner & one Waltham sliding gear Transmission; one 1/2 ton jack shaft with sliding gear Transmission complete. One Star Generator. R-O & L Schebler carburetors.  
**FRED H. TROUT & SON, Tremont, Ill.**

## PATENTS & PATENT ATTORNEYS

**C. L. Parker, Patent Attorney**

Formerly member Examining Corps, U. S. Patent Office, 960 G St., Washington, D. C.  
Pamphlet of instruction sent upon request

## PROTECT YOUR IDEAS

Send for free book and free search plan.

**MILO B. STEVENS & CO.**

53 W. Jackson Blvd., Chicago  
Established 1864. Main office, Washington.

## WANTED

A partner to furnish money to take out patent on a sliding valve gasoline motor that has many points of great merit; to any one interested in this invention I will make them an extremely fine proposition. Write for particulars. Address Ray Liddle, Stevens Co., Springfield, Mass.

## RADIATOR & LAMP REPAIRING

**AMERICAN AUTO SHEET METAL WORKS**  
We are masters of the trade. Manufacturers of Radiators, Hoods, Fenders, Gas Tanks, etc. Repairing a Specialty.  
1446 Wabash Ave., Chicago, Ill.

**A New Radiator or Your Old One**  
repaired. Repairs in one day—a new radiator in two days. We are specialists also on fenders, hoods, gas tanks, lamps, and all auto sheet metal work.

**WABASH AUTO RADIATOR MFG. CO.**  
(Harrison 4126) 1137 Wabash Ave., Chicago, Ill.

## AUTOMOBILE RADIATORS MANUFACTURED

Radiator to fit any car shipped in three days. We fit new core, or any parts in any radiator. Frozen and smashed repaired and returned promptly. All work guaranteed. Sheppard Mfg. Co., 1331 Jackson Blvd., Chicago, Ill.

## CHICAGO MFG. CO.

1466 Michigan Avenue, Chicago

We are the only radiator manufacturers in Chicago making a square tube radiator. New guaranteed cores placed in old radiators. We also manufacture Hoods, Fenders, Tanks and Pans and do guaranteed repair work. Prompt service.

## M and L AUTO SHEET METAL WORKS MOVED

to our large, new, completely equipped factory at 3518 Vincennes Ave. We rebuild and repair radiators and lamps, and manufacture hoods, tanks, fenders, cowl, etc. All work guaranteed.

3518 Vincennes Ave., Chicago, Ill.

## MOVED TO LARGER QUARTERS

We are pleased to announce that we have moved from 58-60 E. 16th St., to our new factory at 1712-14 Michigan Ave., where we have one of the most complete, up-to-date and fully equipped factories in the West for the manufacturing and repairing of Automobile Radiators, Hoods, Fenders, Tanks and the installing of New Cores in old or damaged radiators.

**Illinois Auto Sheet Metal Works**  
1712-14 Michigan Ave., Chicago.

## ONLY RADIATOR FACTORY IN NORTHWEST

Pioneer manufacturer. Why send your radiator down east when you can ship it to us; save time, expense, freight, money, and get best workmanship. Prices right. Make new radiators, allow for old one.

## TODD MANUFACTURING CO.

820-824 Mary Pl. Minneapolis, Minn.

**Wright Cooler & Hood Mfg. Co.**  
1253-5 S. Michigan Ave., Chicago

We make guaranteed radiators that will outlast the car, and can prove to you that our product has 100% better cooling efficiency than others. Standard makes in stock. Our Radiators have stood the test of years.

## REBUILDING AND REPAIRING

### A. A. A. SCORED CYLINDERS

Repaired by electricity. Filled with silver composition. Same piston and rings used. No warping of cylinders. Also welding.

**L. LAWRENCE & CO.**  
Newark, N. J.

## CYLINDER GRINDING

on automatic machinery by skilled mechanics at prices that will interest you. Gears, axles, valves and parts of all kinds made of high grade alloy steel. Send us your worn or broken parts and we will replace them.

Oxy-Acetylene Welding  
of cracked cylinders a specialty.

**ADAPT MACHINERY CO.**

1624 So. Wabash Ave. Chicago, Ill.



# The Clearing House—continued.

## ANDRE G. CATELAIN

Everready Automatic Engine Starter. General machine work for foreign and American cars. Welding of all metals. Manufacturer Catelain Hose Coupling.  
1446-8 Indiana Avenue Chicago, Ill.

## CYLINDERS REBORED AND REGROUND

Fitted with my light pistons and leakless rings.

Watch this space for the most startling announcement, my latest invention in a light PISTON.

## THE LEAKLESS PISTON RING FACTORY

McCADDEN MACHINE WORKS  
ST. CLOUD, MINN.

## CYLINDERS REBORED

Including new pistons and rings, \$7 to \$11 per cylinder. General overhauling and repairing.

### Welding

Cylinders, Crank Cases, and Crank Shafts Welded.

STERLING ENGINE COMPANY  
331 So. Clinton St. Chicago, Ill.

Crankshafts, Crankcases, Connecting Rods, pistons, scored cylinders made equal to new with our New Silver Iron process—use the same piston and rings.

POWELL-ELLIOTT AUTO REPAIR CO.  
143 Rogers Ave., cor. Sterling Pl., Brooklyn, N. Y.

## CYLINDERS REGROUND

Including new pistons and rings for \$5 to \$11 per cylinder. We do this class of work exclusively and are thus able to give you the highest class of work at these prices. Ford cylinders reground, including new pistons, rings and wrist-pins, for \$20.00.

THE CROWN MACHINE SHOP  
Crown Point, Ind.

## LEE W. OLDFIELD

Minneapolis, Minnesota  
Extra light reciprocating parts and accurate cylinder grinding my specialty.

## MORE COMPRESSION

15 to 20% more compression guaranteed on all used cars. You get the same results as having cylinders reground with new rings fitted. Made from a very high fire test mineral oil compound. Keeps the oil from working up in the firing chamber, therefore less carbon, also perfect lubrication.

Put up in liquid form in one quart cans. One application suitable for 5,000 miles. Just Turn It Into the Crank Case.

Price \$1.00

### AGENTS WANTED.

Manufactured By

F. R. FURBUSH Graniteville, Mass.

## THE BOXHILL AND BRUEL CYLINDER GRINDER

is a portable, automatic machine which will quickly and accurately grind and renew worn or scored automobile cylinders. Its first cost is low and it will quickly pay for itself from profits on work done with it. Should be in every high-class garage and service shop. Complete description and price on request.

M. A. BOXHILL & BRUEL  
112 E. Fourth St. .... Cincinnati, Ohio

## TRUMP PISTON RINGS

(Patent applied for) increase power of motor. Prices and circular on request. Cylinders reground, \$4.00 to \$8.00 per cylinder. Interesting proposition for Dealers.  
TRUMP MFG. CO. Crown Point, Ind.

## WE REGROUND CYLINDERS

Furnish our heat treated piston rings and pistons. First-class equipment, 15 years' experience. Write for our prices.

BRIDGEPORT PISTON RING CO.  
Bridgeport, Conn.

## SCHOOLS

FREE BOOKLET—"How to Succeed in the Automobile Business," on application. \$40,000 equipment—eight instructors—actual work, repairing and driving—Day and evening classes.  
GREER COLLEGE OF MOTORING  
1456 Wabash Ave. Chicago

## SITUATIONS WANTED

POSITION AS MANAGER AND SALESMAN of an up-to-date garage; ten years' experience. Am at present employed in similar position. For particulars address

BOX E 289 CARE MOTOR AGE

## SITUATION WANTED

by first class machinist and auto repair man. Address John Zimmgren, Mr. Frank Coffman, R. R. 1, 706 Wiare Ave., Topeka, Kansas.

## WANTED

A place in automobile garage, repair shop or machine shop, with opportunity to work with competent mechanic and machinist and receive practical training in automobile repair work. I have had some experience in light repair work and driving. Have mechanical ideas, good education, steady and reliable. Will work for what I am worth. Will go anywhere. Address Box E 299 c/o Motor Age.

## STORAGE AND SHIPPING

Automobiles Boxed for Export

Henry C. Griffin & Co., Inc.

143-145 Varick St., New York City  
Phone 2071 Spring

## P. BRADY & SON CO.

Trucking and Storage. Automobiles and Bodies Stored. Automobiles boxed for export.

552-558 W. 58th Street, New York  
Telephone 3440 Columbus

## TIRES

### ANNUAL TIRE SALE

In Guaranteed Seconds and Used Tires  
Size Used New Size Used New  
30x3 .. \$5.00 .. \$ 7.40 34x4 .. \$10.00 .. \$15.00  
30x3 1/2 .. 6.50 .. 10.00 34x4 1/2 .. 11.00 .. 19.00  
32x3 1/2 .. 7.50 .. 10.90 36x4 1/2 .. 11.00 .. 19.90  
33x4 .. 9.50 .. 14.00 37x5 .. 14.00 .. 24.00  
10% deposit with order. Balance C. O. D. subject to examination.

ACME TIRE AND REPAIR CO.  
1547 Michigan Ave. Chicago, Ill.

AUTO TIRES!! AUTO TIRES!!  
Tough tread tires. They average 5000 miles service. 30-3, \$6.50; 30-3 1/2, \$8.25; 32, \$8.35; 33-4, \$11.50; 34, \$12.00; 36, \$12.00. All other sizes. Skids 10% additional. For 4000 mile guarantee add 10%. No money in advance.  
TIRE SALES COMPANY, Buffalo, N. Y.

## TIRES TIRES ALL FRESH SELECTED SECONDS

30x3 ..... \$ 6.00 34x4 ..... \$12.90  
30x3 1/2 ..... 7.90 35x4 1/2 ..... 17.90  
32x3 1/2 ..... 8.65 36x4 1/2 ..... 18.25  
33x4 ..... 12.60 37x5 ..... 21.00

All other sizes in Stock. Non-Skid 10% extra. All orders C. O. D. on APPROVAL.

### TIRE SUPPLY COMPANY

1101 Hennepin Ave. Minneapolis, Minn.  
Take advantage of present low prices.

## Make Two Old Tires

do the work of a new one. Send us two of your old casings, regardless of their condition; by our process we return you the two tires made into one ready for 2000 miles of actual service. We guarantee this mileage absolutely. We are doing it for others. Send us two old tires today, or write and ASK US HOW.

## COWANS BROS.

150 W. 55th St. New York City

## WANTED—AGENTS & SALESMEN

### AGENTS WANTED

To solicit Nickel Plating of Automobiles, etc. Big commissions.

Nelson Plating Co. Morris, Ill.

### MAKE \$2.00 ON EACH \$5.00 SALE

Every automobile owner buys. Glareless glass just accepted by Chicago authorities. Beats everything. Motor Antolite, 404 First National Bank Building, Chicago.

### FOR SALE

Formula for Auto Body Polish and Cleaner. Superior to anything now on the market. Can be sold for five hundred per cent profit. Write for full information, to The Polish Products Co., Box 26, Sta. A., Richmond, Va.

### WANTED—SALESMEN

Liberal commission to sell our line of Steam Vulcanizers. Big money made by live wires.

Write for Terms

EUREKA VULCANIZER CO.  
Montpelier, Ind.

WANTED—State or county agents to sell Groll Ford Auto Starters. Ford dealers and owners doing big business with the GROLL. The best mechanical starter ever invented.

THE BUCKEYE AUTO STARTER CO.  
57 W. Main St. Deshler, Ohio

## WELDING

### AA1 WELDING OF ALL METALS

Cast Iron and Aluminum a Specialty  
ADVANCE WELDING MACHINE COMPANY  
525 W. Jackson Blvd. 111 N. Desplaines St.  
Phones: Monroe 3987; Auto. 36-192. Chicago, Ill.

### AUTOGENOUS WELDING

Expert welders on automobile parts. Manufacturer of the Galbraith Welding Torches.

C. SORENSON

18 E. Sixteenth St. Chicago

Oxy-Acetylene Welding, Automobile and Machinery Parts

WELDED AND MACHINED

Cracked Cylinders a Specialty

ADAPT MACHINERY CO.

1624 Wabash Ave. Chicago, Ill.

### WE DO WELDING

others cannot do on parts of aluminum or cast iron. Expert auto repairmen dismantle and reassemble jobs. Ship your worst smashed crankcases and cylinders to—  
HOBBIE'S WELDING PLANT, Hampton, Iowa

### Absolutely Guaranteed Welding

We absolutely guarantee all work done by the OXWELD PROCESS of welding and cutting, including welding cracked or defective cylinders, crankshafts, housings, aluminum crank and transmission cases, etc., etc. Estimates furnished on job and contract welding and cutting of all kinds.

OXWELD ACETYLENE COMPANY

36th St. and Jasper Pl., Chicago, Ill.



# The Clearing House—continued.

## MISCELLANEOUS

### WE SPECIALIZE

In placing and supplying High Grade Technical men in all branches of the Automobile Industry.

**THE TOLEDO ENGINEERING AGENCY,**  
Toledo, Ohio.

## FOR THE FAMILY

Accident Policies paying \$25.00 weekly indemnity for men and women, ages 16 to 65, covering all injuries sustained in automobile accidents.

**Annual Cost \$5.00**

**AMERICAN BANKERS INS. CO.**

D. Gettleman, Res. Agt.,  
45 E. OHIO ST., CHICAGO

## HAVE ORDERS—NEED CAPITAL

for several of my own inventions. New principle Ford self-starter, electric gasoline gauge, sight feed oil gauge with automatic motor stop, automatic electric primer, can more than meet competitive prices. Have working models. Will consider proposition from smaller city. References. Address Box E305, c/o Motor Age.

## The Automobile HAND BOOK

NEW EDITION

By L. ELLIOTT BROOKES  
Assisted by Other Well Known Experts

(41)

PRICE, \$2.00

The Class Journal Co., 910 S. Michigan Avenue, Chicago



## THE AUTO HEEL REST

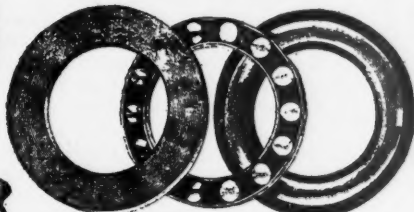
Used on all cars for the Brake, Clutch and Foot Accelerator Pedals. It brings the foot to just the right height. Takes that strain off the ankle.

Four sizes,  $\frac{1}{2}$ "—1"—1 $\frac{1}{2}$ "—2" Price Each 75c  
Polished Aluminum

**J. L. LUCAS & SON**  
30 Fox St. Bridgeport, Conn.

## The Bearings Company of America

Sales Dept.: 250 W. 54th St.  
New York



COMPLETE THRUST BEARING

Manufacturers of Radial Ball Retainers, Thrust Ball Retainers, Complete Thrust Bearings



## Genuine FLAT TUBE HONEYCOMB TYPE

We manufacture radiators for all makes of cars. We have our own radiator department. We also manufacture cores, any model. Write for our Radiator list.

Radiator for Ford Model T. Put radiator troubles behind you. This is the most efficient type of radiator made, and by special arrangement we can furnish these in precisely the same quality and workmanship that you would get on the highest priced cars.

Price each, \$18.00

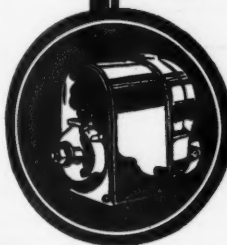
**AUTO PARTS CO., 737-739 Jackson Blvd., Chicago**

## EISEMANN

The most simple—the most accessible—the most durable—the most efficient magneto ever produced is the new Type G-4.

**The Eisemann Magneto Company**

Sales and General Offices,  
32-33d St., Brooklyn, N. Y.  
New York, N. Y. Indianapolis, Ind. Detroit, Mich.  
245 W. 54th St. 514 N. Capitol Ave. 802 Woodward Ave.



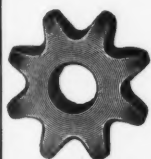
## Polarine

FRICITION REDUCING MOTOR OIL

Maintains the correct lubricating body at any motor speed or heat

**STANDARD OIL COMPANY**

(AN INDIANA CORPORATION)

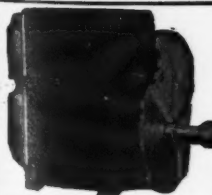


## SPROCKETS

CHAINS AND DIFFERENTIAL

IN STOCK OR ORDER  
SEND FOR NEW CATALOG

**Cullman Wheel Co.** 1341 Altgeld St. Chicago



## FOR FORD CARS

**FISHER ELECTRIC LIGHTING and STARTING SYSTEM**

Motor and generator combined in one compact, self-contained unit, although acting independent of one another. 12-volt, 3-wire system, 6-volt lamps. Noiseless. Attached without machine work. Write.

**Fisher Electrical Works, Detroit, Mich.**

## Blood Bros. Universal Joints



During the 12 years they have been manufactured have been recognized as the strongest and most durable of any in the market.

These valuable qualities will be strong features in the

**Cornelian Light Cars**

BOTH ARE NOW MANUFACTURED BY THE

**Blood Bros. Machine Co., at Allegan, Michigan**

## Manufacturers — Dealers

—you need products that give the greatest percentage of service and highest efficiency. SPEER Metallic Brushes are a standard. Satisfied customers stick.

## Speer Metallic Brushes

Our thoroughly equipped factory, and modern laboratory for special experiments and tests, make the SPEER Metallic Brushes superior in quality and results. Grade KKKK is ideal for voltages from 6 to 20, and is necessary for automobile and electric systems. Good discounts.

WRITE

**Speer Carbon Company**  
Saint Marys Pennsylvania



## Republic Motor Trucks

*The Easiest Selling Line of Motor Trucks in America*

3/4-ton with express body, internal gear drive.....\$ 995.00  
1-ton chassis..... 1350.00  
1 1/2-ton chassis..... 1475.00

### The Vitals of the Republic 1 and 1 1/2-TON MODELS

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Timken Axles	Jack Shaft
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FORMERLY ALMA MOTOR TRUCK CO.

# Index to the

American Oil Products Company..... 86  
Atwater Kent Manufacturing Works..... 80  
Auto Parts Company..... 93  
Automobile Supply Manufacturing Company.. 86

B. and L. Auto Lamp Company..... 78  
Bearings Company of America..... 93  
Blood Brothers Machine Company..... 93  
Bosch Magneto Company..... 59  
Braender Rubber and Tire Company..... 82  
Brennan Motor Manufacturing Company..... 82  
Bricton Manufacturing Company..... 74  
Bridgeport Brass Company..... 86  
Briggs-Detroit Company..... 83  
Broderick and Bascom Rope Company..... 76  
Byrne, Kingston and Company..... 86

Clearing House..... 87 to 93  
Cole Motor Car Company..... 50 and 51  
Connecticut Telephone & Electric Company... 67  
Continental Motor Manufacturing Company... 84  
Corbin Screw Corporation..... 95  
Corcoran Lamp Company..... 85  
Cullman Wheel Company..... 93

Dann Spring Insert Company..... Cover  
Disco Electric Starter Company..... 86  
Dodge Brothers..... 60  
DuPont Fabrikoid Company..... 81  
Dyneto Electric Company..... 85

Eisemann Magneto Company..... 93  
Electric Auto-Lite Company..... 84

Falls Rubber Company..... 77  
Federal Rubber Manufacturing Company..... 62  
Fisher Electrical Works..... 93  
Ford Motor Company..... 80  
Fulton Company..... 81

Gabriel Horn Manufacturing Company..... 73  
Garford Manufacturing Company..... 70  
Goodyear Tire and Rubber Company..... 65  
Gray and Davis, Inc..... 4  
Grossman, Emil, Manufacturing Company..... 43  
Gulf Refining Company..... 76

Hartford Suspension Company..... 64b  
Hassler, Robert H..... 79  
Haywood Tire and Equipment Company..... 72  
Heinze Electric Company..... 84  
Herz and Company..... 83  
Hess-Bright Manufacturing Company..... 66  
Holley Brothers Company..... 83  
Houk Manufacturing Company..... 82  
Hyatt Roller Bearing Company..... 84

Inter-State Motor Company..... 84

Jeffery, Thomas B., Company..... 58  
Jiffy Auto Curtain Company..... 56

K-W Ignition Company..... 76  
Kimball Tire Case Company..... 82  
Kissel Motor Car Company..... 46

Lexington-Howard Company..... 82  
Lisle Manufacturing Company..... 85  
Lockwood-Ash Motor Company..... 81  
Lucas, J. L., & Son..... 93

# Advertisements

86	Manzel Brothers Company.....	82
80	Master Carburetor Corporation.....	70
93	Mayo Manufacturing Company.....	79
86	Mercer Automobile Company.....	81
	Metz Company.....	95
78	Miller Rubber Company.....	48
93	Moline Automobile Company.....	84
93	Monarch Motor Car Company.....	64c
59	Mutty, L. J., Company.....	61
82	Myers, W. M.....	83
82		
74	National Can Company.....	83
86	National Motor Vehicle Company.....	75
83	New Departure Manufacturing Company, 54 and	55
76	New York & New Jersey Lubricant Company..	83
86	Nordyke and Marmon Company.....	82
93	Oakes Company.....	52 and 53
51		
67	Packard Electric Company.....	71
84	Packard Motor Car Company.....	96
95	Pennsylvania Rubber Company.....	84
85	Perfection Auto Starter Company.....	76
93	Perkins-Campbell Company.....	64a
	Pittsburgh Model Engine Company.....	83
	Platt and Washburn Refining Company.....	1
	Prest-O-Lite Company.....	80
	Pyrne Manufacturing Company.....	80
	Regal Motor Car Company.....	63
	Republic Motor Truck Company.....	94
	Republic Rubber Company.....	86
93	Royal Equipment Company.....	2
84	Rutenber Motor Company.....	86
77	Salisbury Wheel & Manufacturing Company...	84
62	Saxon Motor Company.....	64
93	Schrader's, A., Son, Incorporated.....	78
80	Scripps-Booth Company.....	75
81	Searchlight Company.....	82
	Shaler, C. A., Company.....	80
73	Shawver Company.....	80
70	Simplex Tractor Company.....	49
65	Sparks-Withington Company.....	85
4	Speer Carbon Company.....	94
43	Sphinx Motor Car Company.....	86
76	Splitdorf Electrical Company.....	78
	Standard Oil Company.....	93
64b	Stewart Motor Corporation.....	45
79	Stromberg Motor Devices Company.....	83
72	Stutz Motor Car Company.....	57
84		
83	Thermoid Rubber Company.....	77
66	Twitchell Gauge Company.....	85
83		
82		
84	Van Sicklen Company.....	69
84	Western Tire & Rubber Co.....	79
	Westinghouse Electric Manufacturing Company.	68
58	Weston Electrical Instrument Company.....	85
56	Wheeler and Schebler.....	44
	White and Bagely Company.....	72
76	Whitney Manufacturing Company.....	78
82	Wilber, Charles.....	79
46	Willard Storage Battery Company.....	47
	Williams Foundry and Machine Company.....	73
82	Willys-Overland Company.....	Back Cover
85	Winton Motor Car Company.....	85
81	Wisconsin Motor Manufacturing Company....	85
93		
	Zenith Carburetor Company.....	Cover



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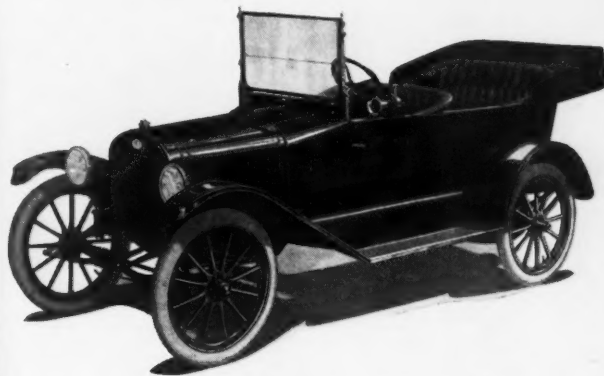
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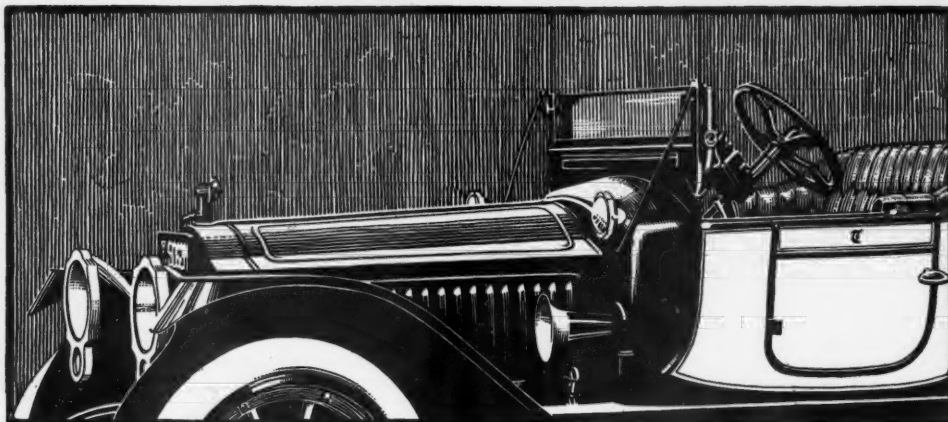
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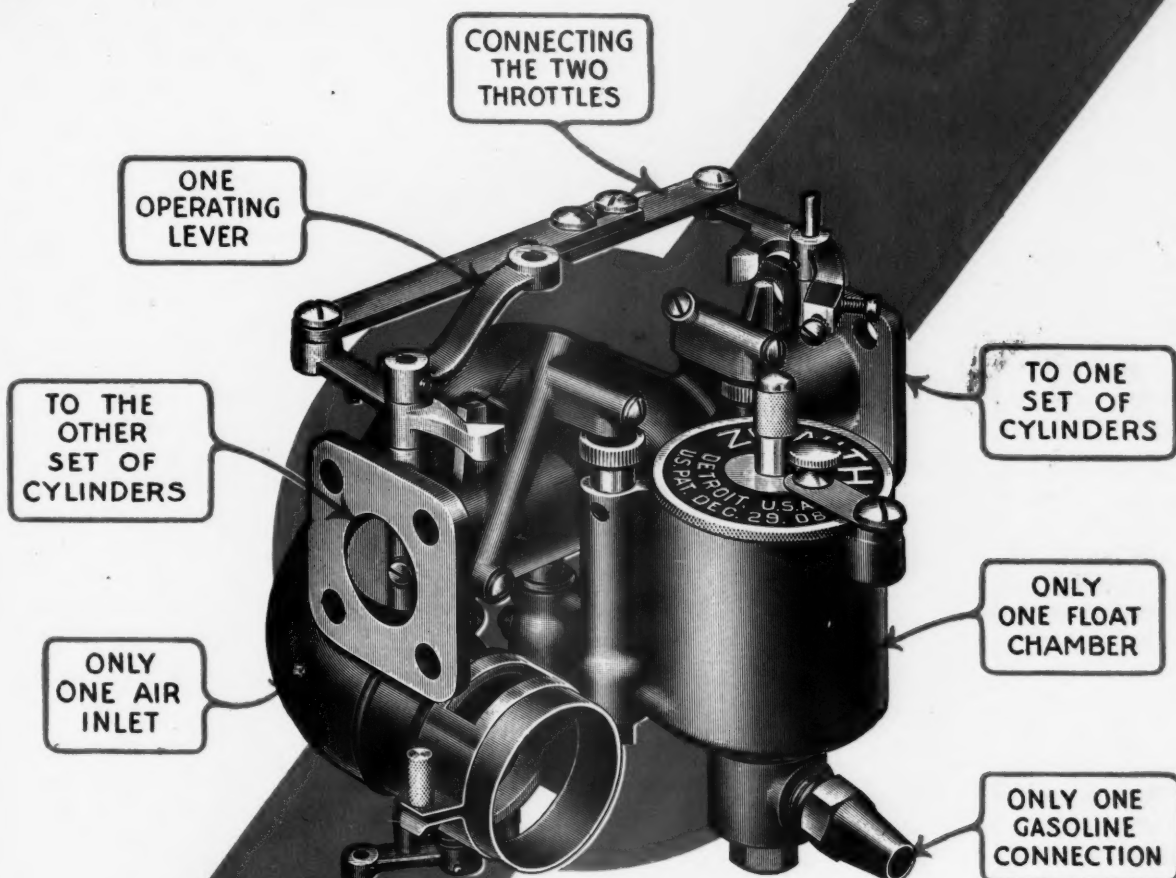
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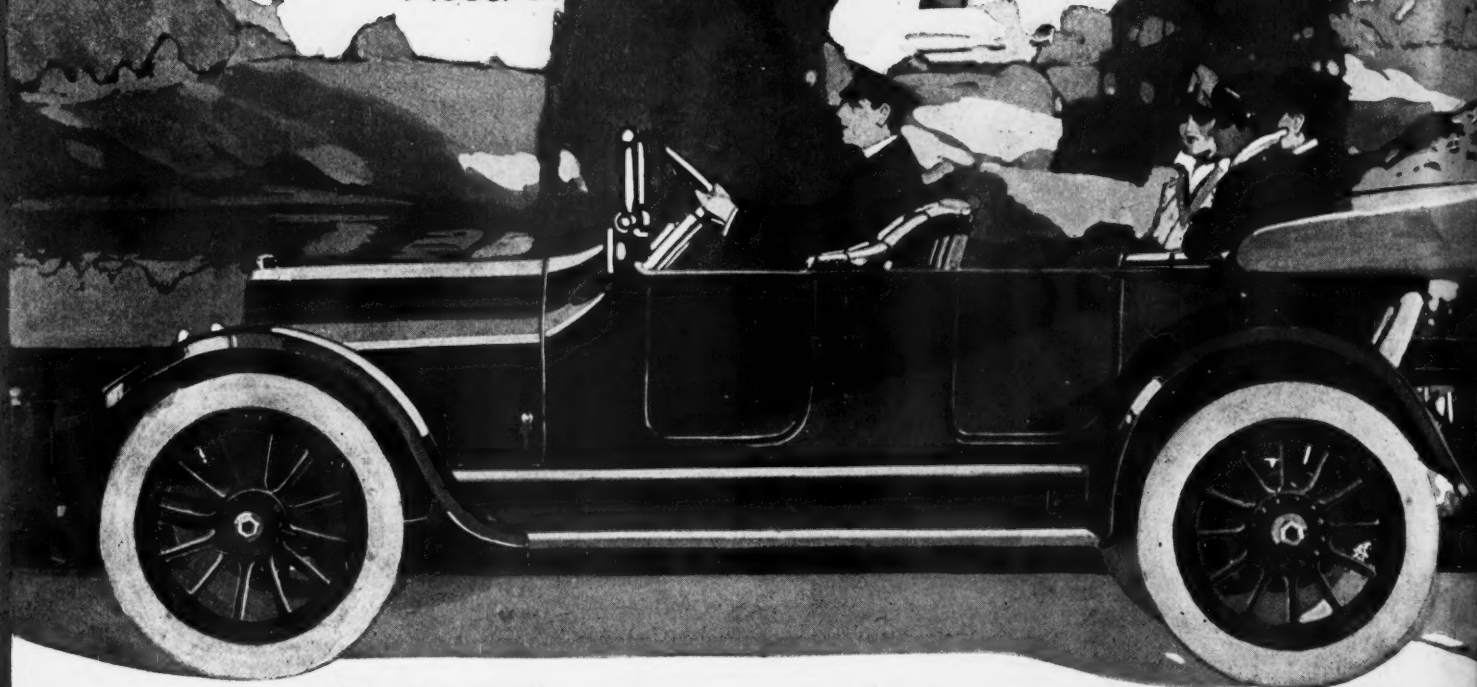


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